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Is the Truck Industry Through With Price Reductions?

About Seventy-five Per Cent of the Truck Manufacturers Are Still Undecided on Whether to Reduce or Not. Claim That Parts Manufacturers Have Not Made Any Material Reductions. Others State That Price Reductions Now Will Not Stimulate Truck Sales. A Few Are Guaranteeing Prices for Remainder of the Year

CONTRARY to expectations the motor truck industry is not witnessing a general price reduction as was evidenced in the passenger car field within the past six weeks. Instead about 75 per cent of the truck manufacturers are holding off on price reductions. A variety of reasons are given, the principal one being that the parts manufacturer has not reduced his prices sufficiently to permit the truck builder in turn to reduce his price.

On the other hand there are quite a number of manufacturers who are of the opinion that any reductions in price at the present time would not increase the sale of trucks one iota. Here is how one manufacturer aptly puts it: "At the present time price will not sell a truck. Before we can find purchasers we must first find business for trucks. Two years ago every man who had a job on which he could use a truck, whether that job was guaranteed for six months or a year, or not at all, he bought a new truck. That is one of the reasons today for so many trucks standing idle; as the original purchasers could not keep up their payments on their notes."

A count of the list of manufacturers appearing in this issue in connection with the Specification Tables, shows a total of 217 concerns. Of this number approximately 50 have announced price changes since September 1st, 1920, some of which have been increases. However, since the first of June, 1921, about one dozen companies have announced price reductions, which shows that there has not been any avalanche in this respect. Perhaps by the time this issue is in the hands of our readers a few more price reductions will have been announced, but present indications do not point to any surprising number. The industry is inclined to stand pat.

The following concerns are guaranteeing prices for some time into the future, unless otherwise indicated:

Armleder (Sept. 15)	Master (1921)
Autocar	Pittsburgher
Commerce (1921)	Rowe
Duplex	Stewart (1921)
Fageol	Traylor
Forschler	Winther
Gary	Witt-Will
Gramm-Bernstein	

The above concerns have indicated their desire to keep present prices standing according to letters received by this office. Therefore, with the exception of the few concerns who have actually committed themselves by guaranteeing prices to a specified date, and the few who expect to keep present prices standing for some time in the future, no decided move has been noted as to what the remainder of the trade expects to do.

The majority of those who are not announcing reductions at this time make the statement that price reductions will not stimulate buying and that those who have announced reductions have done so simply to reduce long inventories or because the banks are calling in loans. In some instances this is true but it does not apply in every case.

Should There be a General Reduction?

Some of the price cuts announced were not prompted by a desire to reduce inventories but due to the general tendency to reduce prices in all manufactured products.

The question is whether or not the whole trade should follow suit in announcing price reductions? In other words, would it benefit the trade if a more general price reduction program was in order so that truck prospects would know that the motor truck industry has fallen in with the spirit of the times and is doing its part in bringing business back to normalcy?

To this some manufacturers will emphatically answer—no! They may be entirely justified in sticking to their present prices but they should at least make such announcement to their dealers that they will know what to do when a customer asks about price. There is nothing more detrimental to a concern's future than to have a customer buy a truck today and within a fortnight find out the same truck can be bought a few hundred dollars cheaper—all because of the fact that the dealer is being kept in the dark. The customer feels that he has been stung and he will naturally be wary of transacting any business with that dealer in the future.

Therefore, if you do not contemplate reducing prices within the next few weeks at least settle on a price which will stand throughout the fall and winter months.

There is another angle to the price reduction situation which many manufacturers have not considered. We believe that if the motor truck manufacturer and the parts manufacturer will analyze the situation carefully he will perceive that the motor truck industry is trying to hold itself aloof from the general wave of lowering prices. The motor truck is a transportation unit. As such it figures prominently in every business in which it is employed. Every merchant regardless as to whether he is handling dry goods, house furnishings, machinery, cement or whatever it may be, is carefully considering the price of every unit which goes into the transaction of his business. It makes no difference whether he is manufacturing or retailing these commodities—he is also figuring transportation costs.

Take, for instance, the case of a cotton goods manufacturer. We will say that he has landed a good-sized order. He is able to buy raw cotton a great deal cheaper than he has for months; it cost him less to

spin the raw cotton into thread than it did six months ago; it costs him less to weave it, and so on down the line. In fact, he has been able to cut production costs considerably in many respects. He needs a new truck, but when it comes to buying a new truck he finds that prices have not taken any decided drop. The transportation of the raw cotton from the railroad terminal to his mill is going to cost him a lot more than he figured. He figures, per-

haps, the old truck will pound along another six months—consequently another truck purchase is delayed, simply because this manufacturer cannot see any sense in buying something which he believes will take a drop in price at a later date.

The foregoing is not a hypothetical case—it is happening every day in the business world. The motor truck industry must get its product down to rock-bottom figures just as quickly as possible. Delay

in this matter is keeping many customers out of the market.

Since passenger car manufacturers have reduced prices passenger cars sales have shown a healthy increase. The motor truck industry can do likewise. The motor truck industry cannot expect to stand on the side line and watch the procession of lower prices march by. It must eventually fall in line—the sooner the better.

Motor Truck Price Changes Since September 1, 1920

Date	Make and Model	Tonnage	Old Price	New Price	Increase
June 1, 1921	Ace	1½	\$2745	\$2295	\$450
June 1, 1921	Ace	3½	3450	2795	655
Apr. 20, 1921	Akron	1	2685	1995	690
June 20, 1921	American	2½	3575	3350	225
June 20, 1921	American	4	4575	4275	300
Jan. 1, 1921	American	5	4500	4500	...
Jan. 1, 1921	Atterbury 7-CX	2½	3575	3375	200
Jan. 1, 1921	Atterbury 7-D	3½	4375	4175	200
Jan. 1, 1921	Atterbury 8-E	5	5975	5575	400
June 1, 1921	Bessemer G	1	1700	1395	305
June 1, 1921	Bessemer H-2	1½	2445	1995	450
June 1, 1921	Bessemer J-2	2½	3285	2595	690
June 1, 1921	Bessemer K-2	4	4485	3495	990
June 1, 1921	Chevrolet G	...	920	820	100
June 1, 1921	Chevrolet T	...	1325	1225	100
July 5, 1921	Clydesdale 18	¾	1890	1890	...
July 5, 1921	Clydesdale 20	1	2385	2385	...
July 5, 1921	Clydesdale 42 C	1½	2750	2475	275
July 5, 1921	Clydesdale 65 E	2½	3775	3450	325
July 5, 1921	Clydesdale 90 C	3½	4400	4100	300
July 5, 1921	Clydesdale 120 C	5	5500	4500	1000
Oct. 15, 1920	Commerce T*	¾-1¼	1350	1450	100
Mar., 1921	Day-Elder A	1½	2100	2225	125
Oct., 1920	Day-Elder B	1½	2450	2300	150
Mar., 1921	Day-Elder C	2	2300	2425	125
Oct., 1920	Day-Elder D	2½	2950	2750	200
Mar., 1921	Day-Elder E	2½	2750	2900	150
Oct., 1920	Day-Elder F	3½	3150	2950	200
Mar., 1921	Day-Elder G	3½	2950	3125	175
Oct., 1920	Day-Elder H	3½	3950	3700	250
Mar., 1921	Day-Elder I	3½	3700	3950	250
Oct., 1920	Day-Elder J	5	4950	4600	350
Mar., 1921	Day-Elder K	5	4600	4875	275
May, 1921	Denby 12	1	2400	2200	200
Oct. 4, 1920	Diamond T-T	1½	2800	2450	350
Jan. 1, 1921	Diamond T-T	1½	2450	2650	200
Oct. 4, 1920	Diamond T-U	2	3485	2835	650
Jan. 1, 1921	Diamond T-U	2	2835	3285	450
Oct. 4, 1920	Diamond T-K	3½	4825	3925	900
Jan. 1, 1921	Diamond T-K	3½	3925	4675	750
Oct. 4, 1921	Diamond T-EL	5	5675	4615	1060
Jan. 1, 1921	Diamond T-EL	5	4615	5400	785
Oct. 4, 1920	Diamond T-S	5	5900	4800	1100
Jan. 1, 1921	Diamond T-S	5	4800	5650	850
Oct. 4, 1920	Diamond T-FS	1½	3100	2715	385
Jan. 1, 1921	Diamond T-FS	1½	2715	2960	245
June 8, 1921	Dodge Panel	...	1330	1135	195
June 8, 1921	Dodge Screen	...	1270	1035	235
Oct., 1920	Federal SD	1	2600	2500	100
Oct., 1920	Federal TE	1½	2825	2725	100
Oct., 1920	Federal UE	2	3150	3025	125
Oct., 1920	Federal WE	3½	4100	3950	150
Oct., 1920	Federal XE	5	4750	4600	150
Oct., 1920	Federal Trac.	3	3325	3200	125
Oct., 1920	Federal Trac.	7	4300	4150	150
June 7, 1921	Ford TT	1	545	495	50
May, 1921	F. W. D. B	3	4900	4200	700
Apr. 1, 1921	Garford 25-B	1¼	2290	2090	200
Apr. 1, 1921	Garford 70-H	2	3450	3190	260
June 22, 1921	Giant 15A	1½	2425	2250	175
June 22, 1921	Giant 16	2½	3150	3050	100
June 22, 1921	Giant 17	3½	4250	4150	100
June 22, 1921	Giant 18	5	5500	5000	500
Oct. 15, 1920	Gramm-Bernstein 15	1½	2250	2050	200
Oct. 15, 1920	Gramm-Bernstein 65	1½	2775	2725	50
Oct. 15, 1920	Gramm-Bernstein 20	2	3275	3175	100
Oct. 15, 1920	Gramm-Bernstein 25	2½	3875	3575	300
Oct. 15, 1920	Gramm-Bernstein 30*	3	4775	4525	250
Oct. 15, 1920	Gramm-Bernstein 35	3½	4775	4375	400
Oct. 15, 1920	Gramm-Bernstein 50	5	5875	5275	600
Oct., 1920	Indiana 12	1¼	2425	2290	135
Oct., 1920	Indiana 20	2	3140	2950	190
Oct., 1920	Indiana 25	2½	3350	3150	200
Oct., 1920	Indiana 35	3½	4150	3750	400
Oct., 1920	Indiana 51	5	5075	4795	280
Mar., 1921	Indiana 51	5	4795	4775	20
June 9, 1921	International 21	1	1850	1750	100
June 9, 1921	International 31	1½	2050	1850	200
June 9, 1921	International 41	2	2400	2100	300
June 9, 1921	International 61	3	2800	2400	400
June 9, 1921	International 101	5	4500	3600	900
Oct., 1920	Jumbo 15	1½	2850	2425	425
Oct., 1920	Jumbo 20	2	3100	2675	425
Oct., 1920	Jumbo 25	2½	3450	3090	360
Oct., 1920	Jumbo 30	3	3950	3590	360
Oct., 1920	Jumbo 35	3½	4556	4080	476
Oct., 1920	Jumbo 40	4	5200	4730	470

* Priced on cord pneumatic tires only.
† Increase.

Date	Make and Model	Tonnage	Old Price	New Price	Increase
Dec. 5, 1920	Kelly-Springfield K-31	1½	3000	2900	100
Dec. 5, 1920	Kelly-Springfield K-34	1½	3000	2900	100
Dec. 5, 1920	Kelly-Springfield K-35	2½	3500	3250	250
Dec. 5, 1920	Kelly-Springfield K-36	2½	3500	3250	250
Dec. 5, 1920	Kelly-Springfield K-40	3½	4400	4200	200
Dec. 5, 1920	Kelly-Springfield K-41	3½	4650	4200	450
Dec. 5, 1920	Kelly-Springfield K-42	3½	4650	4200	450
Dec. 5, 1920	Kelly-Springfield K-50	5	5100	4900	200
Dec. 5, 1920	Kelly-Springfield K-60	6	5500	5100	400
Oct., 1920	Kleiber AA	1	2400	2600	200
Oct., 1920	Kleiber A	1½	2800	3100	300
Oct., 1920	Kleiber BB	2	3200	4000	800
Oct., 1920	Kleiber B	2½	3800	4200	400
Oct., 1920	Kleiber C	3½	4400	4900	500
Oct., 1920	Kleiber D	5	5300	5600	300
Mar., 1921	Maccar H	2½	3750	3650	100
Oct., 1920	Maxwell	1½	1472	1332	140
Oct., 1920	Moreland 20-B	1½	3725	3125	600
June 15, 1921	Moreland 21-B	1½	3125	2800	325
June 15, 1921	Moreland 21-C	2½	3900	3500	400
June 15, 1921	Moreland 21-H	4	4975	4600	375
June 15, 1921	Moreland 21-J	5	5350	5000	350
Mar., 1921	Packard EC	...	3850	3700	150
Mar., 1921	Packard ED	...	4900	4450	450
Mar., 1921	Packard EF	...	5950	5550	400
Mar., 1921	Packard EX	...	4650	4200	450
Jan., 1921	Paige 51-18	3½	4385	4285	100
June 24, 1921	Pioneer AA	1	1750	1550	200
May, 1921	Rainier R-20	2½	3650	3600	50
June 24, 1921	Reliance 10A	1½	2500	2400	100
June 24, 1921	Reliance 20B	2½	...	3100	...
Mar., 1921	Republic 10	1	1655	1695	40
Mar., 1921	Republic 11X	1½	2195	2295	100
Mar., 1921	Republic 20	3½	3895	3845	50
May, 1921	Riker BB	4	4700	4800	100
Mar., 1921	Rowe CW	1½	2800	3000	200
May, 1921	Samson E-25	1¼	1185	1395	210
Jan., 1921	Sandow G	1	2295	2195	100
Mar., 1921	Sandow G	1	2195	2295	100
Jan., 1921	Sandow CG	1½	2590	2490	100
Mar., 1921	Sandow CG	1½	2490	2590	100
Jan., 1921	Sandow J	2½	3375	3175	200
Mar., 1921	Sandow J	2½	3175	3375	200
May, 1921	Sandow J	2½	3375	3275	100
Jan., 1921	Sandow M	3½	4395	4095	300
Mar., 1921	Sandow M	3½	4095	4295	200
Jan., 1921	Sandow L	5	5175	4775	400
Mar., 1921	Sandow L	5	4775	4975	200
Oct., 1920	Selden A	1½	2460	2360	100
Oct., 1920	Selden A	2½	3550	3425	125
Oct., 1920	Selden A	3½	4325	4175	150
Oct., 1920	Selden A	5	5770	5600	170
Sept. 1, 1920	Standard 1K	1½	2250	1950	300
Sept. 1, 1920	Standard 76	2½-3	3520	3100	420
Sept. 1, 1920	Standard 66	3½-4	4410	4000	410
Nov. 20, 1920	Stewart 11	¾	1450	1350	100
Nov. 20, 1920	Stewart 12	1	1850	1750	100
Nov. 20, 1920	Stewart 9	1½	2450	2200	250
Nov. 20, 1920	Stewart 7	2	3075	2800	275
Nov. 20, 1920	Stewart 7X	2½	3200	2950	250
Nov. 20, 1920	Stewart 10 and 10X	3½	4100	3850	250
June 20, 1921	Superior D	1	1800	1650	150
June 20, 1921	Superior E	2	2750	2600	150
Oct., 1920	Traffic C	2	1495	1595	100
Mar., 1921	Traylor B	1½	2075	2500	425
Mar., 1921	Traylor C	2	2875	3000	125
Mar., 1921	Traylor D	3	3375	3500	125
June 20, 1921	United V-5	5	5100	5000	100
Mar., 1921	Velle 46	1½	1925	2200	275
Mar., 1921	Vim 29	1½	1355	1555	200
May, 1921	Vim 29	1½	1555	1555	...
June 13, 1921	White 15	¾	2600	2400	200
June 13, 1921	White 20	2	3450	3250	200
June 13, 1921	White 40	3½	4500	4200	300
June 13, 1921	White 45	5	5000	4500	500
June 10, 1921	Wilson F	1½	2650	2270	380
June 10, 1921	Wilson EA	2½	3300	2825	475
June 10, 1921	Wilson G	3½	4300	3685	615
June 10, 1921	Wilson H	5	5275	4520	755
Oct., 1920	Winther 70	3½	4250	4200	50
July 1, 1921	Wolverine	1	2240	2125	115
July 1, 1921	Wolverine J	1½	2495	2375	120
July 1, 1921	Wolverine J	2	2695	2640	45
July 1, 1921	Wolverine K	2½	3475	3425	50
July 1, 1921	Wolverine L	3½	...	4100	...

There Are Plenty of

Opportunities for Truck Sales

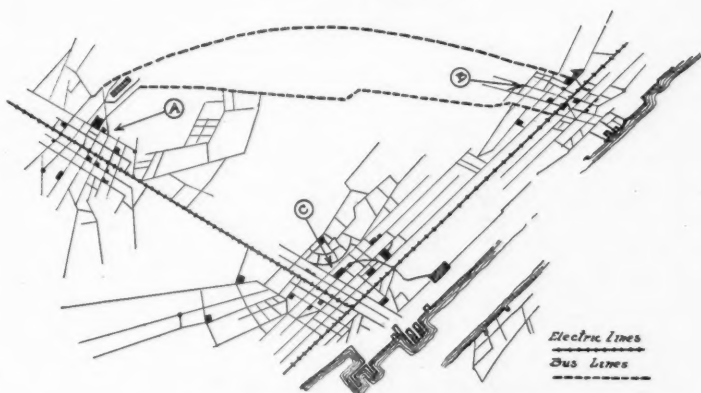
Here Are a Few Suggestions on Digging Out New Prospects. Try Them Out in Your Locality

By A. V. COMINGS

THESE are days when every sales suggestion helps in the motor truck industry. Salesmen and dealers should more than ever keep their wits at work to find new places to sell trucks, for the uses to which the motor truck may be put, have not by any means been exhausted. The average dealer thinks he has no further chance to sell motor trucks when he has sold to the retailers, wholesalers, manufacturers, expressmen and other obvious purchasers, but if he will only look around him and make his salesmen do the same he will uncover many a prospect who never was considered such by him before.

How About the Cross-Town Bus Line?

For instance, take the case of the cross-town bus line established in Columbus, Ohio, some time ago. Columbus car lines run parallel to each other, several squares apart, from one of the largest residential sections in the city, and have been this way for a generation. It has always been difficult to get from one part of this "East End" to another, north or south, as it was necessary to take a car



How a Bus Line Can Function Advantageously in a Town Where Electric Railways Cross Each Other But Do Not Connect Outlying Points

down and then to transfer out again.

In spite of this, no motor truck dealer ever had the originality or the sales sense to interest a prospect in putting on a motor bus line cutting these car lines well out, so that passengers could go "cross town" without having to go down town.

It remained for a merchants association on one of these streets to see the excellence of a line like this, and this association then had to go and ask dealers to sell them a truck to run this schedule. Of course the dealers were eager enough

to sell the truck then, but if some far-sighted dealer had been using his thinking apparatus a year or more ago, or five years, he might have made the sale without competition, for he would have had the jump on his competitors.

Have you, Mr. Truck Dealer, some car lines in your city that might profitably be connected by a motor bus line? Maybe there's a sale waiting for you there.

Here's another one. Out in an Iowa city last summer the truck dealers knew in a general way that country schools were using more

motor trucks every year to gather up the scholars and land them at their school houses and at their homes after school. But they didn't go after this business that was already in the air or try to persuade backward school boards that trucks were the thing for them to use. That is, only one of the dealers did. This dealer not only went after this business strong himself, but he sent out a campaign among his sub-dealers and the result was that they all got busy, sold most of the buses that were planned for by school boards and talked several townships into using them that had planned to get along another winter with the old horse-drawn vehicles.

Right now is a good time to get together all the facts and figures possible on motor trucks for district schools and get after this business. Several thousand of those busses are already in use, tens of thousands more will be in use within the next few years. Get your share. The Firestone Tire & Rubber Co., by the way, publish a little booklet on this subject that every dealer in motor trucks ought to own. Send for it.

The Traveling Library

Did you ever connect motor trucks with traveling libraries? Well, maybe there's a prospect in your vicinity for a motor truck to use as they are using one out of Hibbing, Minnesota. Hibbing, by the way, is a real, honest-to-God city, even though it is up in the Mesabe iron range, and its schools, streets, churches and pub-



Country Schools Are Users of Motor Trucks. Get the School Board of Your Community Interested in Motor Transport

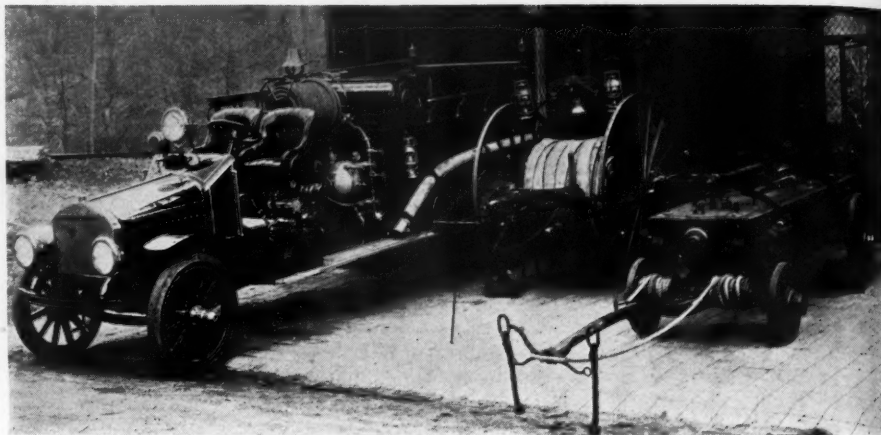
lic buildings are models that might well be followed by other communities. Another fine thing they have in Hibbing is a public library, and out of that public library every few days goes a load of books to be distributed far and wide to people living in the country roundabout Hibbing. That load of books goes out on a traveling library motor truck, a truck very conveniently fixed up to handle the books just as if they were being distributed from a library on a stone foundation.

Farmers outside the city where you live would probably be mighty glad to have a traveling library come to their farm every week, so that they could have the same books to read that city people have. Why not try to interest your library board in getting a motor truck and trying out this plan? Maybe there's a sale of a truck for you right there.

Host of Possibilities in Transport

And in the Hibbing territory, too, out of Duluth, travels a wholesale tobacco store on a motor truck. Instead of shipping the cigars and tobaccos needed by the smaller stores of the villages in that section, a forehanded Duluth wholesaler keeps this motor truck on the go, and the salesman who drives it makes his deliveries right from his truck, so that the stores are enabled to carry less stock, have fresher stock, and get better service in all ways. The plan has worked well. Might it not be that some wholesaler in your territory, looking for just this edge on his competitors, might be interested right now in putting out a truck with a travelling tobacco store on it? Try them out and see.

Why there are no end of possibilities for salesmen who will keep their eyes open, their wits keen, and their feet paddling around looking for new places to put a truck in these quiet times. There's a successful drug store moving about on a motor truck down in Ohio, motor truck grocery stores are numerous the country over, and meat markets, too, and I firmly believe that the surface has hardly been scratched on the list of things the motor truck may bring to the farmer from the city and to the city from the farmer.



Many Fire Companies, Both Volunteer and Organized Through City and Town, Need Modern Fire-Fighting Apparatus

What the industry needs as much as anything these days is a research department that will be able to furnish dealers with leads along new lines, that may act as a clearing house for the spreading of information on new uses of the truck, for if one business is dull that has been a good market for trucks, surely there are many other uses to be found for so versatile a vehicle, and the industry might well spend a little money digging up these ways.

Prospects Where Least Suspected

Your average motor truck dealer or salesman would hardly see a prospect for motor truck sales in the religious custom of Kosher butchering, as practiced by Jews, yet here is an instance that shows where queer leads sometimes result in real business.

A dealer in one of the larger midwest cities having a large Jewish population was importuned several times by the advertising solicitor of a big Jewish weekly to insert an advertisement of his trucks in the paper. He finally gave the man a four inch, two, column advertisement rather as a matter of policy than as a real business producer.

A short time later a Jewish rabbi came into his salesroom, with the advertisement cut out of the paper in his hand.

"I want to buy a truck," he said.

And, needless to state, he was accommodated.

What would a Jewish rabbi do with a motor truck, you will ask.

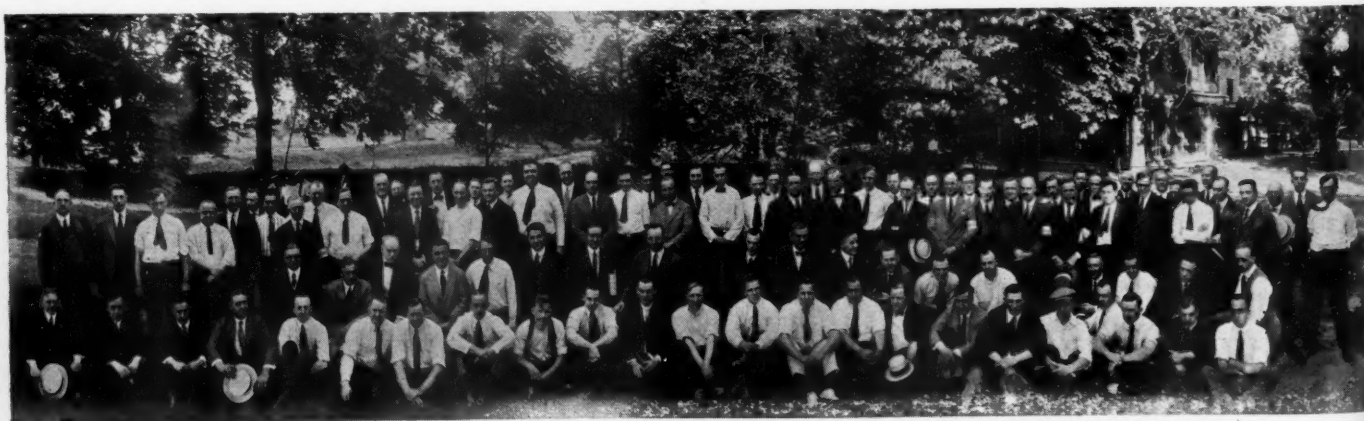
Well, the Jewish custom as to butchering includes certain rites which only a rabbi can perform, and this truck was used to go out in the country, gather up chickens and other fowls, and bring them to the Rabbi for his blessing before they were killed.

One truck paved the way for others, and the result of this little advertisement and the lead it developed was six three-quarter ton trucks, sold just to serve this Kosher butcher shop.

Is there a goodly Jewish population in your city?

Sell 'em some motor trucks with which to bring in the chickens.

Statistics for the manufacture of machinery issued by the Department of Commerce Bureau of Census, comparing the figures of 1914 with those of 1919, give the following tabulation on the rubber working machinery industry: For 1919, number of establishments, 51; value of products, \$13,915,000; for 1914, number of establishments, 14; value of products, \$2,726,000.



Some of Those Who Enjoyed Themselves at the Philadelphia Motor Truck Association Outing Held June Fifteenth at Kugler's Mohican Country Club on the Delaware River

Does the Expenditure of

\$1,250,000,000 for Road Building

Mean Anything to You, Mr. Dealer?

HIGHWAY construction from the standpoint of its present magnitude is too young a proposition to permit every-one interested to view its possibilities as it will be practicable to view these within the next year or two. No figures are available showing the number of miles of all types of highways that probably will be built during the current year. The best grasp one can get on the situation is to consider for a moment the sum total of accumulated appropriations in the form of bond issues or other revenues that have been made available for highway work. This total now considerably exceeds a billion and a quarter dollars. There is every reason to believe that within the next five-year period, funds provided for highway improvement in this country will have reached a total of more than five billion dollars—and all within a period commencing practically with the termination of the world war.

That there is a market for motor trucks in highway construction is evidenced by the great number now being used for that purpose. That this market will extend should also be evident, if one can appreciate what the figures of probable expenditures on highway work just given mean. The best trucks, like any other mechanical equipment, wear out and, although \$5,000,000,000 is a huge sum, no one would claim that it is anywhere near sufficient to complete the mileage of permanent roads which this country urgently needs.

One-hundred Carloads of Equipment and Materials Per Mile of Highway

It has been estimated that for every mile of highway constructed, there must be transported 100 carloads of equipment and materials. This is the transportation side of highway construction from the railroad viewpoint. It must be remembered, however, that the railroads do not lay down the materials and equipment that they move on the site of the job. There is always a haul of varying length from the nearest railroad station to the construction project, and there is nothing uniform about the distance of this haul, although, of course, all hauls of the kind can be averaged to a certain extent.

As a matter of fact, many highway jobs have been carried on and are being carried on at the present time without dependence on railroad transportation other than for mechanical equipment coming from a distance. In some types of construction most of the necessary materials are along or near the right-of-way. Movement of

such materials then is strictly a wagon and team or motor truck job.

Motor Truck Requirements Vary

It is impossible to write down anything in the form of an estimate as to the motor truck requirements in connection with highway construction because of the wide variation in size of contracts, the difference in quantity of materials and equipment to be moved with particular reference to the type of construction, the size of gang and hence progress of the work per day, as well as other related factors which will come to almost anyone's mind after a moment's thought.

The best basis on which to visualize requirements is from the standpoint of the figures just given, namely 100 carloads of equipment and materials must be moved for every mile of highway constructed. This may be taken as an average for all types of construction.

Naturally there will be for a long time to come much material to be moved in connection with road improvement that does not go into so-called permanent roads. For years to come we will, no doubt, have miles of gravelled highways springing into existence as a stage better than the ordinary dirt road. At the present time, considering one type of construction only, there are under contract carried over from last year and placed under contract since the opening of the present construction season, more than 5,000 miles of such road.

Truck Requirements on Concrete Road Construction

This, as on any other type of construction, depends upon the size of the contract. It is obvious that only one-tenth of the materials must be moved on a one-mile contract as will be required on one ten miles long. A typical example of two extremes of requirements may be taken from two concrete roads now under construction. One of these is in Minnesota. The length of haul is four miles; two miles of this is over concrete road already finished and two miles over earth subgrade prepared for pavement. The hauling equipment used consists of ten 2½-ton trucks on pneumatic tires. Their speed, loaded, is from twelve to twenty miles an hour, depending upon the condition of the road. Empty, these trucks make from fifteen to twenty-five miles an hour, depending also on road conditions. The weight of load carried is about two and three-quarters tons and consist of materials required for what is known as two 4-sack batches of 1-2-4 concrete. The output of the gang working on this job in

a ten-hour day is 1,300 square yards of concrete pavement.

Another typical job is in Montana, where the length of haul is 2½ miles over earth roads and graded subgrade prepared for concrete pavement. Here the hauling equipment consists of five 5-ton trucks. Weight of load carried is from five to six tons and the output per day of eight hours is 720 square yards of pavement.

The length of contract or the sum total of a number of contracts which a contractor has for a season determines the amount of equipment he will decide upon as necessary. On the short contract he may find it more profitable to hire than to own trucks. It must also be recognized that because of the newness of modern methods of highway construction, these methods have not become standardized with respect to execution by individual contractors. Also, contractors from other fields are continually entering the highway field, some of whom will just naturally drop out of business after a while, while others will perfect methods and record progress.

Then, too, there is a variety in methods of handling materials. Within the past two or three years central mixing, as well as central proportioning plants have sprung into operation. The merit of these new methods has not yet been stamped with any thing like general approval. In one case it means that mixed concrete is hauled from a more or less distant central plant and dumped on the subgrade, while in another case truckloads of correctly proportioned materials are brought to a mixer at the site of the work to be transformed there into concrete.

Dealer Should Study Local Conditions

It must be evident, however, that the vastness of highway construction programs present and undoubtedly to come, point to the highway construction field as an inviting one for the motor truck manufacturer's development. He should, however, study the many and varied requirements as to size and type of truck, with particular reference to size of gang and proposed speed of construction, so that bodies and mechanical details can be developed with particular reference to highway construction requirements. It is probably true that fleets of trucks operating largely over unimproved roads or unfinished subgrade, where highway construction is in progress, will suffer more from usage due partly to neglect than would trucks operating for any other purpose on improved city streets or other highways.

TRANSPORTATION EQUALITY

By M. L. PULCHER, Vice-President and General Manager Federal Motor Truck Company

MANY States are proposing legislation to limit the load that can be carried by motor truck to such a degree that thousands of firms and men now owning heavy duty equipment will be forced out of business, and capital invested in their trucks will be almost a total loss. Also, State and National taxation of motor trucks and passenger cars is being carried to an unreasonable point.

"It seems that the old fable of killing the goose that laid the golden eggs has been forgotten, for motor trucks are one of the greatest aids to commerce that we have today. Motor trucks hauled 1,200,000,000 tons of freight in this country in 1920. This stupendous tonnage was almost one-half that carried by the railroads in the same twelve months, and which amounted to 2,504,000,000 tons.

"These figures do not represent a competitive tonnage, however, for most of the goods hauled by the trucks were also hauled by the railroads, and vice-versa. If the fast motor haulage had not fed the railroads, then the latter could not have transported this great volume. On the other hand, if the railroads had not borne the burden of the long haul, then the trucks could not have had the shipments to deliver at the other end.

"But there are other ways in which the motor truck helps business and government besides quantity of goods hauled. The profits made in manufacturing them are taxed by the government. An additional excise tax is collected on the sale of each motor truck. The eventual owner also pays a State license tax, usually based on horsepower and weight. And, in addition to all this, some States are now collecting a fixed sum for heavy duty trucks. In others, as before stated, they are ruling heavy duty trucks off the road—or taxing them off—which amounts to the same thing in the end.

"There are five main means of transportation today—steam, electric, inland waterways, motor vehicle, and horses. Each one is particularly suited to certain kinds of transportation, and should be allowed to do that haulage for which it is fitted with the least hindrance. They all serve the public, which, in the end, is the government. There should be no discrimination against any one of these as opposed to the other. Each should grow and develop in proportion to its usefulness to the country. Certainly, motor truck owners, because they are making a fair living, should not bear a disproportionate part of the expense of government, nor should trucks be legislated off the roads or taxed where other forms of highway transportation are not.

of these car owners use their passenger cars more or less for business.

"As far as traffic laws are concerned, motor truck manufacturers and motor truck operators are agreed that there should be laws governing the gross weight, width and length of vehicle and load, and that the first of these, the weight, should be on the tire-inch basis, but they feel that all States should have a uniform law. Much motor trucking today is interstate, and as they are regulated today, operators never know whether they are breaking the laws until they are held for some infraction. Indeed, in many States the laws are so unreasonable that all truck owners are automatically infringing on the regulations.

"The Federal Highway Council Uniform Road Law is eminently fair, we believe, to all roads and to all truck owners. This law limits gross weight to 28,000 pounds and 800 per tire-inch, and speeds on pneumatic tires up to this limit of weight to 25 miles per hour. Lesser speeds are provided for different weights on solid tires. Fifteen States have already adopted this law, which is endorsed by many highway officials and associations. Legislation that limits weight and speed of motor trucks should be the same the country over, the same as that governing rates on common carriers. These laws, properly enforced, would then govern truck operation properly, prevent undue injuries to the road, and be fair to everyone concerned.

"That our present National govern-

ment realizes these things, and will eventually bring about an equality of burden on the various forms of transportation is our firm belief, based somewhat on President Harding's own statement that, 'The motor vehicle has become an indispensable instrument in our political, social and industrial life, and that highways are not only feeders to the railroads and



Which? Some or None

"If someone answers, 'The automobile and truck spoil our good roads,' just ponder over this fact—it is the automotive vehicle that has brought us the better highways, and has contributed largely to their maintenance. Two-thirds of the 9,000,000 automobiles and 1,000,000 trucks are owned by people whose incomes are \$4,000 or less per year. Ninety per cent

afford relief from their local burdens, but that they are actually lines of motor traffic in interstate commerce.

"This view is shared by many men high in government and State offices, and will, no doubt, be an influence to discour-

age discriminatory legislation such as is being now proposed in many States, as well as to influence a sane and less discriminating taxation program.

"It is certain that the automobile and truck are vehicles of usefulness. They

are common, necessary conveyances. Such an additional tax on them as was recently proposed by Secretary of the Treasury Mellon would be as senseless as one levied on the farmer's horse and wagon or upon every boat plying our rivers and lakes."

A Prominent Distributor Tells How the Truck Manufacturer Can Help the Dealer

What Do You Think About It?

By A. V. COMINGS

THESE are days of changing conditions in the motor truck industry. Men and methods that "got by" in the old rush days are proving dross in the fierce heat of today's crucible competition.

Great selling reputations have proved mere bubbles when pricked by the keen point of sales necessity.

Corporation executives, on whom has fallen the burden of financially carrying on through these sterner days, realize the imminence of disaster unless they may so reorganize their merchandising plans that their retail dealers are able to go forth thoroughly equipped with modern sales weapons to make the winning fight.

What is the greatest help the motor truck manufacturer can extend his retail selling organization today? What can the factory do that will best fit the dealer to outsell his competitor?

Many answers might be made that question. Here is one, and it comes from one of the most successful motor truck distributors and dealers in the country, a man who handles one of the best known trucks in two states as a distributor and whose retail selling organization, in one of the country's largest cities, is considered a model of efficiency. Says this motor truck dealer:

"The factories can, and undoubtedly will, do a lot of things in the future for the distributor and the dealer that they are not doing at the present time, and I say this without any criticism of our factory or any other particular factory. But business conditions are changing, and things that were not necessary in the past will be very necessary in the future.

"To my mind, the greatest assistance that could be rendered to us all would be the furnishing to us of authentic information that would enable us to really sell the right unit to a truck buyer. This may sound strange to some to think that a distributor who has been handling trucks exclusively for about ten years, and who has made an honest effort to give the right installations, would not be able to do this. However, it is a fact. What we wish to demonstrate is the profit and possibilities that could be developed from a business research department in a truck factory.

"Business once depended largely upon the business genius in business, but today we believe the outside point of view, the gathering of facts, is vitally necessary to successful selling. Manufacturing and distributing facilities are wider and greater. Margins of profit are closer and competition more keen. Business was once to a great degree the measure of a man. It is now the measure of an organization and they must both analyze their business to succeed. They must, in a great measure, rely on the specialized work of others.

Too Costly for Average Selling Organization

"We believe there are few selling organizations in this country who can afford the time and money necessary to analyzing transportation costs in various lines so that the results could be used in selling motor trucks right. For instance, suppose we were to start an investigation of transportation conditions in the creamery business, the lumber business, coal handling and many others with which we should really be intimately acquainted, it would take such a large amount of time and detailed investigation that our selling organization would have but little time to put in selling our trucks.

"The automotive industry has a capable organization, the National Automobile Chamber of Commerce. It would seem to me that if the Chamber were to operate a transportation research department it could furnish manufacturers and dealers with operating costs in various lines of business which would be very accurate, and through a careful study of the various lines of business and conditions governing them this department could give us a very good idea of the sizes and types of trucks proper for each particular line of work. They could also, through the proper research, recommend the proper loading and unloading methods that would save time and make the trucks more valuable to their owners, could suggest better loading docks and a number of things that would help sell more trucks.

"Of course, we believe any large factory could do this for itself, and that this kind of research would pay a big interest on the investment. However, it might be

that the truck buying public would accept the data with better grace were it to come from the National organization. This would show the customer that the figures were not gathered through selfish motives by any one manufacturer, to sell his own particular line of trucks, and it would show him that the industry as a whole was working to solve his transportation problems.

"We do not feel that we are selling merely a truck. We are selling transportation, we are selling the railroad of the future, and we need accurate data to sell this transportation at its most economical figure.

Other Industries Have Done It

"We need data such as they have in other lines of merchandising. There is no guess work when you go to the adding machine people, or other high types of machinery manufacturers. The leather tanner will tell you the kind of leather to use in certain makes of shoes, and the paint manufacturers will give the humblest buyer advice as to the proper kind of paint to use on certain types of buildings. These companies have eliminated guess work in their selling campaigns for many years. They sell the customer what will best suit his needs.

"We have, in our organization, worked and thought along these lines for some time, but no organization the size of the average distributor's can afford to spend the money or take the time necessary to go into a problem like this in the right way. I hope that COMMERCIAL CAR JOURNAL can bring this matter before the manufacturers in such a light that they will give it the utmost consideration. It would be a serious waste of money for each manufacturer to get up his own data on each separate line of work. And it would be serious if several manufacturers laid before a common prospect as many different cost figures as there were salesmen after the order. It would make the prospect doubt all costs.

"What we need is a national research bureau, with its findings available to all truck manufacturers and through them to their dealers. When we get this every dealer in the country can sell transportation efficiently and business will be on a much sounder basis than it is today."

Cashing-in on Trailer Sales

Truck Manufacturer Should Adopt Some Make as Standard and Sell It Through Dealer Organization

By H. F. BIGGAM, General Manager Biggam Trailer Company, Milwaukee

WHEN the first trailer was put on the market nearly all motor truck sales managers raised the hue and cry that every trailer sold meant one less truck. The engineers took up the cry that motor trucks would not stand the additional work required to pull trailers.

I doubt very much if there is a sales manager left who does not now realize that trailers instead of reducing truck sales have increased them. Thousands of hauling problems on which motor truck hauling was cost prohibitive, but which by using trailers and trucks reduced hauling costs to a point where they more than compete with team costs, have proven the value of the trailer to the motor truck industry.

Truck engineers, when they realized that trailers had come to stay, got busy and incorporated changes and new features in motor truck design and construction, so that today any motor truck of standard approved design and construction will give satisfactory results when used with trailers, where the user had the judgment to have the proper equipment installed. There are, of course, some people with hauling problems which nothing would satisfy. Some still adhere to horses and wagons, because their granddads used them.

Trackless transportation has developed to a point where it is necessary for sales managers and engineers to get busy again and absorb some new ideas about trailers.

In the interests of their organization it is necessary for them to be in a position to dictate what shall be used as a trailer back of the product that they are manufacturing and selling. There are some non-descript vehicles, miscalled trailers, with which no motor truck would stand up as a power plant for their operation. A lot of good trailers are being installed without an intelligent survey of the conditions under which they will be used with the bad effects of a black eye to motor truck and trailer alike.

The only solution to this problem is for the motor truck manufacturers to adopt some make of trailer as a standard, put their name on it and sell it through their sales organization.

This would not only be profitable from a monetary standpoint, but would place their dealers in a position to equip their customers with equipment suited to each individual case, and would eliminate the inconvenience of the purchaser buying his equipment from several sources.

The motor truck companies have spent fortunes and are still spending fortunes

in their efforts to produce trucks which will give satisfaction under all conditions. Their efforts are being constantly nullified by truck users using the class of vehicles before mentioned as trailers. The motor truck manufacturers' only means of protection in this matter is to place themselves in a position to dictate as to what shall be used with their trucks as a trailer, and the only way to do this is to sell trailers.

Unluckily, in the past the general idea was that anything with wheels could be used successfully as a trailer. But experience has taught the fallacy of this idea.

Engineers who recognized that engineering problems did enter into the design and construction of a trailer considered that these problems were parallel to the engineering problems entering into the construction of motor trucks. This is a fallacy. The engineering problems encountered in the design of a trailer to give satisfactory results to all, are peculiar to the trailer, particularly where the trailer is of the four-wheel reversible type. The steering must be automatic. The center of the trailer chassis must follow the center line of the motor truck. It must run without snake or wobble.

Trailer Also Requires Attention

A man buys a motor truck and knows that if it is going to run it must be kept in gas and lubricant and gives it more or less (in a good many instances less) care, but he buys a trailer and, as it has no engine, transmission, etc., he seems to think it should take care of itself. He is careful to run his truck into the garage at night and in most instances is just as careful to leave his trailer out in the alley to take care of itself. He will overload a truck 20 to 25 per cent and quit; but he will pile the load onto a trailer as long as a foot of space remains. These conditions must be met by the trailer designer and manufacturer. Manner of lubrication must be simple. Factors of safety of all parts must be high enough to take care of excessive overloading. Coupling should be as near automatic as possible. Safety first for the operator must be borne in mind at all times when designing.

Most sales managers favor the plan of adopting some trailer as standard, but some are afraid of the trailer manufacturers, other than the trailers they adopt. Really this viewpoint is foolish. They have adopted certain makes of engines as standard, certain tires as standard equipment, and, in some cases, give the

option of two or three other makes of tires, but did anyone ever hear of a motor company or a tire company going out and knocking any make of truck because their sales department had failed to get a contract with this particular company? The resistance of one of the large tire companies to any particular truck would be of many times more weight than the combined resistance of all of the trailer manufacturers in the country. Their argument is not sound. The evidence of "sour grapes" would be only too strong and react against any trailer manufacturer foolish enough to undertake such tactics. A few, and luckily a very few, sales managers left the impression that they were too lazy to make the necessary effort required.

The viewpoint of the engineers was very favorable, their main desire being to be sure that the trailer adopted would be correctly designed and constructed and the motor truck engineers can be trusted to decide as to the best trailer to be adopted and the selection of the trailer should be left largely to the engineering departments.

With very few exceptions, the dealers, and only high class dealers were interviewed, are in favor of putting in a line of trailers. These trailers to carry the same trade name as the motor truck they sell.

The first requirement for the decision of the truck companies is a trailer correctly designed and constructed.

The trailer publicity should be borne by the trailer manufacturer.

The sales burden should be borne by the trailer manufacturer.

The trailer manufacturer should have specially trained men to in turn train the motor truck salesman. These men should be capable transportation engineers more than salesmen. Men should be capable of analyzing any hauling problem, no matter how intricate, in order that the correct equipment would be installed.

Shipments should be made direct from the trailer factory to dealers or customers.

This plan would not necessitate the carrying of stock or the physical handling of trailers by truck manufacturers.

In view of the fact that the truck manufacturers can adopt a trailer as their standard without any investment or expense to themselves and without obligating themselves for other than their trailer requirements, it does seem to the writer that this is the solution of the trailer problem for the motor truck manufacturer and dealer.

Unique Demonstration Tours Have Won Business for Samson Tractor Company

THE Samson Tractor Company has put over a unique truck demonstration which has produced remarkable results, it is stated, both from a sales and engineering standpoint. With the newly designed truck to merchandise, and facing the problem of successfully marketing the truck during these times, it was finally decided that eleven trucks should be sent out into the various branch territories, spending from one to three days with each Samson dealer along the route, demonstrating the trucks' qualities and special features for both farmer and city man.

It was pointed out that great good would result not alone from a sales standpoint, but also from that of engineering. These truck tours would serve in all six purposes: Introduce the new truck to trade and prospects, uncover prospects, promote sales, help and pep up old Samson dealers, gain new dealers, and due to the gruelling grind to which the trucks would be subjected, help the engineering department to check up any minor faults.

The various branch managers were instructed to prepare tentative routes, whereby a maximum number of their dealers could be visited in the shortest possible time. It was also necessary for them to personally travel these routes, building interest and enthusiasm amongst the dealers and securing the promise of active co-operation from them.

In the meantime the Home Office was busily engaged getting out the preliminary promotion work. Special advertisements and form letters were sent to the dealers along the routes, together with the electrotypes of the demonstration trucks. Pep letters and telegrams were sent to the dealers, and the thousand and one other details attended to which were so necessary to the success of the tours.

The trucks finally determined upon to make the tours were regular three-quarter-ton stock jobs, with nothing but regular equipment, which included electric lights, starter and extension bases and cleats. These trucks had been running all winter between the Janesville Plant and the Samson Malleable Iron Plant, at Waukesha, Wisconsin. They had made six thousand miles, carrying capacity loads, traveling every day and in all sorts of weather, over roads that sometimes were nearly impassable. With this six thousand miles as a starter it was planned that the trucks should be given such a complete work-out that any faults in their construction and design would be sure to appear before the completion of the run.

The drivers were not mechanical experts or service men, but the regular driver, the man who operates the country's trucks, possessing only sufficient mechanical knowledge for the successful every-day operation of a truck.

On Wednesday, April sixth, the first truck put off, bound through the Wisconsin and Minnesota territories. What proved to be a sure indication of the forthcoming result of the tours was received in the form of a telegram from the first truck driver two hours and a half after he had started. "Arrived Palmyra forty miles in one hour fifty minutes. Sold one Samson Truck." Since then the remarkable success of the demonstration tour, as a merchandising factor, has been thoroughly proven.

At the very beginning of the tour the trucks had to fight their way through a storm, which worked havoc through the central portion of the middle west at that time. After having successfully weathered the blizzard the trucks were put to work demonstrating for the farmers, one of the primary objects of the tours.

At each dealer's place of business the farmers assembled to witness the demonstrations were asked to suggest work for the truck to perform. They were impressed with the fact that the Samson truck crew wanted to do the hard things—climb the steepest hills, haul the bulkiest, most cumbersome loads, for that sort of load is easy for the Samson. For the benefit of those unfamiliar with the Samson line, Samson trucks are built with the driver's seat placed over the transmission and with the steering wheel, clutch and brake on the left of the engine. This conserves cab space and gives the Samson truck nearly 33 1-3 per cent more loading space than would be possible with conventional design; load is also equally distributed over all four wheels. This construction also brings the truck box or platform much closer to the ground, making the loading of bulky, cumbersome and easily breakable commodities much easier and safer.

During the tours with the Samson trucks, they demonstrated the hauling of nearly every conceivable commodity at

the request of those interested: lumber, coal, dirt and slag, sand, ice, milk, gravel, glass, salt, cement, paint, newspapers, flowers, farm crops, cattle, etc. An effective demonstration of the safer and easier method of handling glass, due to the lower body, was made, resulting in a sale. One truck hauled a load of sand from a loose sand pit, where other trucks have been pulled out by horses. The same truck traveled eleven miles in thirty-five minutes, carrying fourteen hundred pounds ballast, on two-thirds gallon of gas or about sixteen miles to a gallon.

Many remarkable hill-climbing demonstrations were made under load. At Jamestown, N. Y., the Samson truck climbed a 35 per cent grade, King Street hill, famous as a staller of both trucks and passenger cars. During the climb four passengers were carried. One, a farmer, had told the driver he would buy a Samson if the truck climbed the hill. He did.

Fuel and oil records are being kept of the trucks, which from the reports already received point to the establishing of a great fuel and oil record. This will appear in due course of time. The schedule arranged will keep some of the trucks on tour up to September.

Many benefits have been derived from these truck tours. They have stirred up business, uncovered an untold amount of live prospects, helped and pepped up old dealers and obtained new ones.

To Hold Salesmen Contest

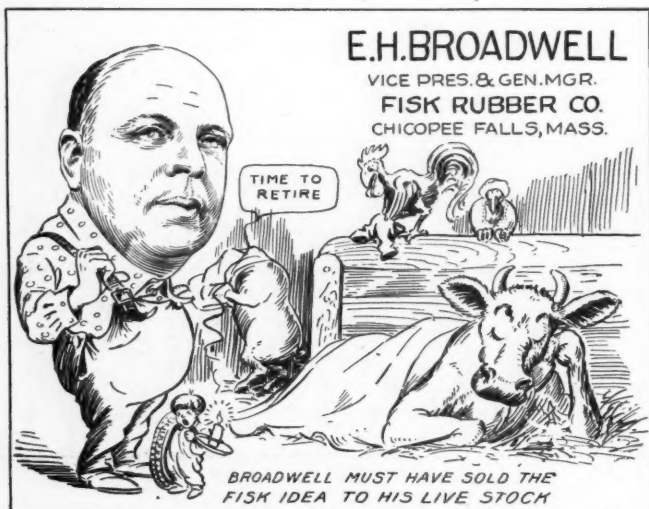
A plan to stimulate salesmen education has been devised by the Klaxon Co., of Newark, N. J. It consists of a prize contest for jobbers' salesmen for the best selling talk directed to an accessory dealer for the purpose of getting that dealer to stock Klaxons. The prizes are \$50 for the best talk and \$10 each for the five next best ones.



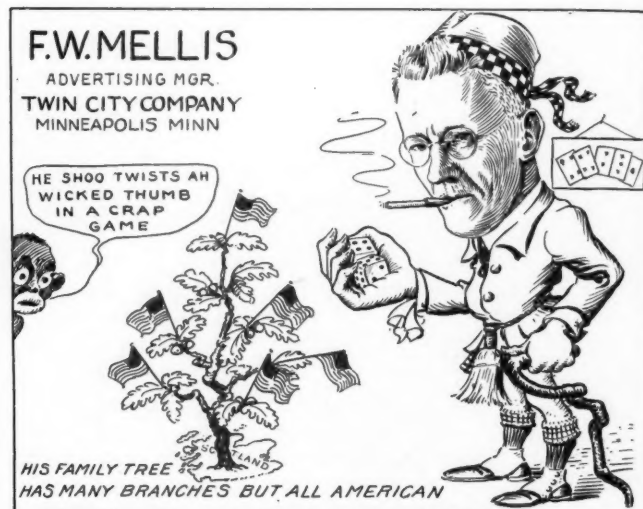
One of the Samson Trucks Starting on a Merchandizing Tour



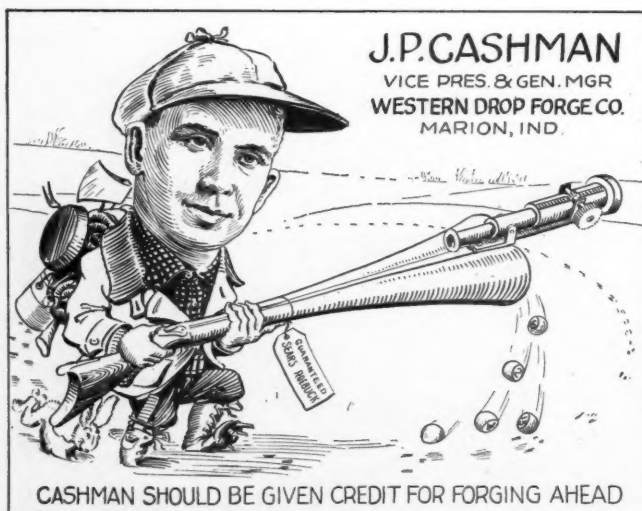
FRIENDLY TIPS ABOUT SOME "BIG ONES"



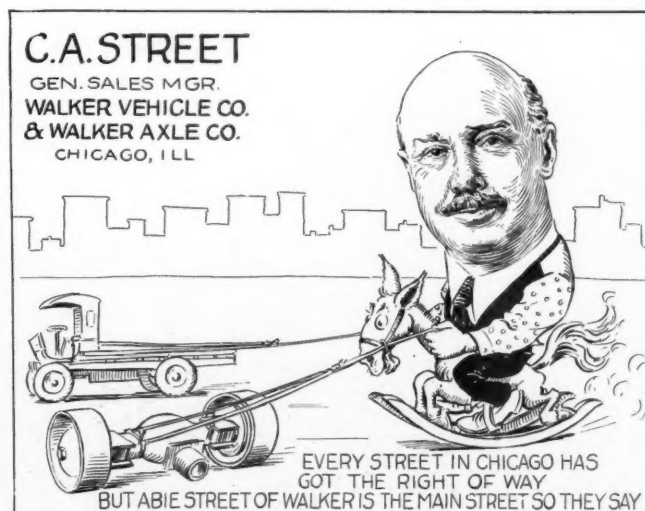
E. H. Broadwell—One of the pioneers of the automobile industry, having "graduated" into it from the bicycle business. In 1900 opened first branch of Fisk Rubber Co. in Detroit and continued there until 1907. Then went to New York in charge of factory sales and advertising. Then became associated with Hudson Motor Car Co. as Vice-President in charge of sales. Three years later rejoined Fisk Rubber Co., Chicopee Falls, Mass., as Vice-President and General Manager.



F. W. Mellis—Born in Perth, Scotland, and educated in that city. First training in law, but forsook that field for newspaper reporting in Scotland and England. Came to Canada in 1911 and to the United States in 1914. Since 1911 has been chiefly engaged in advertising and publicity work, including agency and merchandising investigations. As we are going to press just advised by Mellis that he became a full-fledged American citizen in May. He has been with the Twin City Company for three years.



J. P. Cashman—Born in Marion, Ind., 1893. After completing school and business training course started with Western Drop Forge Co. in clerical position. This was in 1907. In 1916, after series of promotions, was made Assistant to General Manager; made Secretary of the company, 1919; later also made Treasurer. In 1920 became General Manager and Vice-President and relinquished office of Secretary. Therefore is now Vice-President, Treasurer and General Manager of the above company.



C. A. Street—Born in Maumee City, Ohio, June 26, 1867. Had wide experience in textile machinery field and is now General Sales Manager of the Walker Vehicle Co. and the Walker Axle Co.



EDITORIALS



Store Door Delivery Being Revived

RECENT activities in the store door delivery movement have led to the agreement to restore this system in Baltimore, Md., where this system existed for forty-seven years prior to being abolished by the Interstate Commerce Commission in 1913. As the result of a special meeting held in Baltimore recently this service will again become a reality. An interesting feature of this meeting was the activity displayed by the railroad representatives present, who went on record as being one hundred per cent in favor of re-establishing store door delivery.

Store door delivery will bring about a clearing up of freight congestion in railroad terminals. At the present time entirely too much effort and time is wasted in delivering freight from terminals to consignee. Under the store door plan this freight congestion will be eliminated. It will reduce the congestion at freight terminals due to the endless lines of separately owned trucks delivering or calling for less than truck load merchandise. Large communities in which this plan is carried out will be zoned and the all-truck movements will be under the general management of the store door delivery system. It is estimated that a saving to Baltimore shippers of between two and three millions of dollars annually will be brought about. It will also eliminate the extension of railroad terminal facilities and the increase of rolling stock to a great extent. It is asserted by authorities on this subject that the shortage of freight cars, when industry is running at full capacity, is not due to the actual shortage of cars but due to the delays in loading and unloading. With store door delivery in operation freight cars would be unloaded promptly.

The Service Station Personnel

MANY dealers fail to realize that selling service requires just the same high grade salesmanship as it does to sell the vehicle itself. Nothing is more discouraging to the average truck owner than to have someone in the service department treat him with indifference, or make him feel, now that he has bought the truck and paid for it, that he is at the mercy of the service department and that, if he wants anything, he has to kick for it as well as pay for it. Such an impression can easily be gained by the customer who has just bought a new truck, and who is just making his first visit to the service station for an adjustment or a trifling repair.

Here is where the glad hand stuff can be made to count for something. Here is where courtesy and fair dealing can be brought into play for the purpose of securing the future business of that customer. Give the customer to understand that the purpose of the service department is not alone to repair cars but to see that he is satisfied in every respect.

The finest equipped shop in the country and the best mechanics obtainable will not inspire that respect for a concern which it should enjoy, if the personnel of the organization treats the truck owner with indifference. The owner must be sold on the whole organization. Make the customer feel that you are just as interested in his truck after he has bought it as you were in getting his name on the dotted line.

Use Your Influence

WHY is it that every time a motor truck smashes into something on a city street or a child is run over that a prominent place is generally given such news in the daily press? Why is it that such an accident is given more prominence than an elevator accident in a prominent department store of any large city? And in the latter case the accident is hardly ever reported, and names are never mentioned.

The reason is apparent. In the first place the department store is usually a good supporter of the advertising columns of the daily press. Scare heads telling of a terrible elevator accident on the front page of local paper is not the kind of publicity that would attract customers to a store.

But with motor truck accidents it's different. They furnish the basis for a sensational news story. The reporter who happens to be on the job at the time of even a minor accident feels it his duty to write a most blood-curdling story and the city editor with his supersensitive nose for news, slaps the story on the front page. The dealer reads the story and disapproves of such publicity. But that's the end of it as far as he is concerned.

What he should do, however, is to call on the editor and explain to him that such publicity is doing more harm than good. Get your trade association to help in this. The newspaper editor is human. He will listen to reason. If enough pressure were brought to bear a lot of this uncalled-for sensational news relative to motor truck accidents would not be given the space allotted to it in the average daily paper.

News of the Trade in Brief

Tariff Bill Would Reduce All Automobile Duties to 25 Per Cent

The first committee print of the tariff bill made public by the Ways and Means Committee of the House of Representatives contained a number of clauses of particular interest to the automotive industry. Some of the important points were:

The import duty on all automobiles, bodies, chassis and parts, not including tires, is decreased to 25 per cent of American valuation. The duty under the Underwood Act was based on the lower foreign valuation. When a foreign manufacturing country imposes a higher duty for such imports, duties here may be similarly increased, not to exceed 50 per cent ad valorem.

Under special provisions, the President is empowered and directed to meet any import duties levied by other countries which he may deem to be reciprocally unequal and unreasonable, by suspending similar schedules here and levying such additional duties as he may deem necessary to equalize such rates.

The duty on aluminum, aluminum scrap and alloys of any kind in which aluminum is the component part of chief value, is increased from 2 cents per pound to 5 cents. Request of the aluminum producer was for 7-cent tariff.

Crude oil and fuel oil are listed for duty of 35 and 25 cents per barrel, respectively.

Motor vehicles sold for war purposes, on which the U. S. internal taxes were not paid, would be subject to a duty equal to those taxes upon reimportation into U. S.

Assurance has been given that a resolution will shortly be introduced in the House which may provide duty as high as 300 per cent on reimported war material of American manufacture; such procedure would afford protection at earlier date than tariff.

To Enter Production on Steam Truck

After two years' experimentation, a steam truck is to be brought out by the Alena Steam Products Co., Indianapolis, Ind., a concern headed by Fred Hamilton, president and chief engineer. The truck is of 5-ton capacity, weighing more than 9850 lb., with a speed capability of 37 m.p.h.

The company also has been experimenting with a smaller truck and will complete a tractor, built on the same principles, shortly.

The officers of the company are: Fred Hamilton, president; George W. Kilman, vice-president, and John W. Cadle, secretary and treasurer. C. E. Gordon is sales manager. An experimental station is maintained at Sixteenth and Alabama Streets. R. B. Hall is superintendent.

New Vim in Production

Harold B. Larzelere, vice-president and general manager of the Vim Motor Truck Co., of Philadelphia, taken over by the Standard Steel Car Co., of Pittsburgh, will continue in that office, it has been announced.

The plant is now working at about 20 per cent of capacity and producing 14 motor trucks per day. About 300 people are employed.

Coming Events

SHOWS

September, 1921—Sacramento, Cal. Seventh Annual Show during State Fair. Automobile Tent (30,000 sq. ft.). Passenger Cars, Trucks, Tractors, Accessories and Agricultural Implements. State Agricultural Society, Sacramento.

September 6 to 10, 1921—Indianapolis, Ind. Auto and Accessory Show, under the auspices of the Indianapolis Auto Trade Association. John B. Orman, Mgr.

September 23 to October 8, 1921—New York City. Electrical Exposition, at 71st Regt. Armory, Park Ave. & 34th St. Exhibit will include electric vehicles. Address: Norman Maul, 130 East 15th St., New York City.

CONVENTIONS

Absecon, N. J., July 21, 1921—Twentieth Annual Summer Outing of the Rubber Association of America, Seaview Golf Club.

Boston, Mass., September or October, 1921—Tenth Annual Congress of the National Safety Council.

Chicago, Ill., July 30 to August 14, 1921—Pageant of Progress Exposition, Automotive Division, Municipal Pier, Address Henry J. Kramer, 507 City Hall, Chicago.

Chicago, Ill., October 12 to 14, 1921—Annual Convention of the National Implement and Vehicle Association. H. J. Samiet, Sec'y, 72 West Adams St.

Chicago, Ill., November 14 to 19, 1921—Annual Convention and Business Exhibit of the Automotive Equipment Association at the Coliseum.

Cleveland, Ohio, October 18 to 20, 1921—Convention and Exhibit of the National Tire Dealers' Association, Hotel Winton.

Coden, Ala., July 25 to 26, 1921—Midsummer Convention of the Alabama Automobile Dealers' Association.

Elkins, W. Va., November 8, 1921. Semi-Annual Meeting of the West Virginia Automobile Dealers' Association.

Greenville, S. C., July 20, 1921—Semi-Annual Meeting. South Carolina Automotive Trade Association.

Lansing, Mich., August 30 to 31, and September 1, 1921—Annual Convention of the Michigan State Good Roads Association.

Lake Tahoe, Cal., August 15 to 16, 1921—Northern Division meeting of the California Automobile Trade Association.

New York, N. Y., November 22, 1921—Convention of the Factory Service Managers, National Automobile Chamber of Commerce. Address, Marlin-Rockwell Bldg., Madison Ave. and 46th St., New York City.

New York, N. Y., January 11 to 14, 1922—Annual Meeting of the Society of Automotive Engineers, Engineering Society Bldg.

FOREIGN EVENTS

Brussels, Belgium, December 3 to 15, 1921—Annual Belgian Automobile Show.

London, England, October 13 to 23, 1921—Olympic Commercial Car Show.

London, England, November 4 to 12, 1921—Olympia and White City, Fifteenth International Motor Exhibition. Apply to exhibition manager, Society of Motor Manufacturers and Traders (Ltd.), 83 Pall Mall, London, S. W. 1.

Paris, France, October 5 to 16, 1921—Automobile Show. Grand Palais.

Utrecht, Holland, September 6 to 16, 1921—International Industrial Fair. American Representatives: The New York Chamber of Commerce for the Netherlands and the Netherlands East and West Indies, Inc., 44 Beaver St., New York.

Farms Are Still a Big Field for Truck Sales

That the farm is one of the industry's largest potential markets for the motor truck is forcibly brought out by the survey being conducted by the National Automobile Chamber of Commerce through the various state agricultural departments and county agents.

So far, replies have been received from nine states, two of which gave no statistics on the number of farms in their respective states. A rough tabulation of the results is as follows:

	Farms	Trucks on Farms	Need for More Trucks	Size of Truck Preferred
New Hampshire...	15,772	535	Yes	½-1-2
Idaho	33,864	1,034	Yes	1-1½-2
Colorado	25,412	3,650	Yes	1-1½-2
Tennessee	772	No	No	½ to 2
New Mexico.....	17,133	1,320	Yes	1-1½-2-3
North Carolina...	94,377	2,138	Yes	1-2
Rhode Island....	3,500	1,350	Yes	½-1
Maryland	2,817	...	...	1-1½
Pennsylvania	186,863	12,631	Yes	½ to 2

In Tennessee, 11 counties need more trucks while 13 do not. Three- to five-ton trucks are reported in Idaho and Tennessee.

Disregarding the states where no farm totals are given, the seven states show a total of 376,921 farms with a total of 22,658 trucks. These figures show 6.01 per cent of the farms as truck users, or one truck for every 16.635 farms.

Truck Rates Repealed in Nebraska

Orders establishing rates for common carriers by trucks on the highways in Eastern Nebraska entered during various parts of 1919 were recently repealed by the State Railway Commission. This action has been taken because the Commission is convinced that trucking for hire in more than local service will succeed only when proper attention is paid to the costs of operating trucks and to the promotion of short-haul quick traffic, with return loads properly developed. They claim that when hard surfaced roads have been constructed and trucking transportation can be had a definite number of days in a year, costs of the business may be ascertained accurately enough upon which to project a rate basis.

In the length of time that the authorities have attempted to stabilize the business, not only in the interests of those who risk their capital, but in the development of an important arm of transportation service, there has been such a lack of co-operation on the part of concerns as to warrant giving no further consideration to the matter of regulation for protection of the financially interested.

Standards Committee of S.A.E. Has Proved Its Value

At the Standards Committee meeting held recently at West Baden, Ind., 23 recommendations were approved for submission to the voting members of the Society of Automotive Engineers. The presiding officer at the meeting was B. B. Bachman, the chairman of the Committee. The adoption by the Society of these recommendations will bring the total number of S.A.E. Standards and Recommended Practices up to 250. The immensity of this work can be appreciated when it is realized that if automotive parts, fittings and materials were fabricated in accordance with all the sizes and analyses specified in the 224 standards adopted to date, the total number would be 2307; or if all the parts and fittings were separated into their component parts, the total number would be 3,482.

Information received in returns to circular letters and similar ways of obtaining data indicates that standardization of parts and materials results in the reduction in sizes or analyses in current practice to those sizes adopted as standard in the ratio of more than 6 to 1, a reduction of more than 80 per cent. The adoption in future production throughout the automotive industry of the standards adopted at the West Baden meeting will mean a large cumulative saving to producers and users, the one which will probably result in the greatest economic saving being the recommended practice for motor-truck front-axle hubs which reduces the number of hub and spindle sizes to 10.

The following proposed standards were approved at the Standards Committee meeting: Clutch Release Type Thrust Ball Bearings, Exhaust Tubing Sizes, Universal-Joint Hubs, Drain-Cocks, Stationary-Engine Belt Speeds, Stationary-Engine Crankshafts, Lubricator Cups, Stationary-Engine Water-Pot Capacities, Motor-Truck Bodies and Motor-Truck Front-Axle Hubs.

Revisions of the following existing standards were approved: Insulated Cable, Automobile Nomenclature, Magneto Mountings, Two-Bolt Type Carburetor Flanges, Bases, Sockets and Connectors and Square Shaft Fittings.

The extensions recommended for the following standards were approved: Roller Chain, Roller-Chain Sprockets, Disk-Clutch Fly-Wheel Housings, Head-Lamp Brackets and Motorcycle Head-Lamp Mountings.

Recommendations to cancel the S.A.E. Standards for Cast-Iron Carburetor Flanges and Rating of Isolated Electric Lighting Plant Storage Batteries were also approved.

The recommendation of the Parts and Fittings Division for ball-stud dimensions was referred back to the Division for further consideration as was the recommendation of the Isolated Electric Lighting Plant Division for a storage battery rating in terms of number of hours discharge capacity at a constant rate corresponding to 200 watts or ten 20-watt lamps.

The recommendations approved by the Standards Committee were confirmed by the Council of the Society and at the

Business session of the Society members, but must be balloted upon by the entire voting membership of the Society before becoming official S.A.E. Standards and Recommended Practices.

Highway Regulations Closely Observed, Tests Show

With many States adopting legislation regulating truck tire equipment and carrying heavy loads on public highways, authorities are becoming increasingly active in checking up to see that load limitations are not exceeded.

Under the plan first used by most States having such regulations, motorcycle officers when they suspected an operator to be piloting a load above the maximum, hailed the offender and all proceeded to a public scales. In the majority of cases the truck was not overloaded and the tire equipment was of the correct size and type. So, considerable inconvenience, not to say expense, was unnecessarily involved.

According to a truck tire official of the Firestone Tire & Rubber Co., there is now coming into general use by these States an ingenious and most practical machine known as the loadometer, which is a combined jack and weight indicator. Placing one beneath each axle the truck and load is lifted clear of the road and at the same time weighed. When this operation is completed the type and size of tire is checked up to see if same comes within the State law, for the weight recorded.

These tests not only enable the authorities to enforce the law, and assist in its preservation, but they bring out the interesting fact that truck tire dealers are demonstrating their qualifications as transportation experts, for instances are rare, if not non-existent, where the truck's tire equipment has been found out of accord with State regulations, or the wrong size and type, according to the standard of transportation engineers.

This is not surprising, for the truck tire dealer of today, when called upon to supply new equipment, first makes a careful analysis of all the conditions under which the truck must operate. The roads on which the truck must travel, its usual type of load and the truck's capacity are closely considered and then, having based his decision on tables prepared by tire and transportation engineers, the tire dealer recommends the type of tire—cushions or pneumatics—and signifies the correct size for front and rear wheels, respectively.

In this way not only is the interest of the public served to the extent of close co-operation in the matter of highway preservation, but the investment the truck operator has in his truck is protected, as well, when equipped with the proper size and type of tire.

Reduced prices for all truck models have been announced by the Moreland Motor Truck Co., of Los Angeles. The new prices are as follows: 1½-ton, \$2800; 2½-ton, \$3500; 3½-ton, \$4600, and 5-ton, \$5000.

M. & A. M. A. Issue Purchase Chart

A temperature chart of the industry, showing in statistical form month-to-month-purchases by automobile passenger car and motor truck makers from three hundred parts and accessory manufacturers was made public for the first time by the Motor and Accessory Manufacturers' Association, covering the period from January 1 to the end of April. Since this survey was not inaugurated until 1921, there is no basis for comparison with last year's figures.

This chart shows three curves—the sales of parts and equipment to vehicle manufacturers, the total of past due accounts reported and the total of notes outstanding reported. In all three items, the curve from the beginning of January to the end of April indicates basically healthy and progressively improving condition in the automotive industry, with increasing progress in the restoration of a safe and sane normal.

The totals of past due accounts and notes outstanding, showed substantial decrease for the same period, thus indicating that the bedrock financial factors in the automobile industry have been improving steadily and soundly.

The figures follow:

Month	Total Purchases Per cent Change	Total Past Due Acc'ts Per cent Change	Total Notes Outst'g Per cent Change
Feb.	66.15 inc.	17.07 dec.	39.08 inc.
March ...	93.30 inc.	16.57 dec.	16.38 dec.
April	32.93 inc.	4.49 dec.	5.94 inc.

The United States was represented at the Conferences of Secretaries of National Standardizing Bodies, by Dr. P. G. Agnew, secretary of the American Engineering Standards Committee, at the meeting recently held in London. The conference was a most successful one and it is felt that it constituted an important forward step in establishing a closer relationship and understanding between the various national bodies.

The industry has been singularly honored by the election of Alfred Reeves, general manager of the National Automobile Chamber of Commerce, to the office of president of the Trade Organization Secretaries of New York, which consists of the executive officers of more than 80 trade organizations. Association holds monthly meetings to discuss problems which have to be met by organizations of manufacturers, wholesale and retail.

Interesting Bulletin Issued on Live Stock Marketing

A comprehensive treatise on the "Marketing of Live Stock By Motor Truck" has been prepared by the Firestone Ship By Truck Bureau, Akron, O. The bulletin points out the part the truck is playing in the marketing of live stock, the benefits resulting to the farmer from its use and suggests the field of economic usefulness for the truck in marketing live stock. There is a chapter on "Rates and Roads" and several pages on buyers and prices.

A New York Banker Makes Some Timely Hints on the Automobile Industry

An extremely constructive letter has been received by Alfred Reeves, general manager of the N. A. C. C., from Henry H. Bizallion, president of the Gotham National Bank, of New York, on the automobile industry. The banker believes that the price adjustments in industry are beneficial and expresses the hope that the mid-season price changes will be final. The letter is herewith produced.

Dear Sir:—

As we handle more automobile merchants' accounts than all other banks in New York combined, we are deeply interested in the continued prosperity of the retail automobile business. This interest is very direct, in that many of these dealers have been our customers for the past ten years.

Price adjustments in the automobile business, the same as in other lines of industry, were inevitable and we are very glad to see that these adjustments came in much more orderly fashion than they did in other industries. According to your price lists all the readjustments seem to have been accomplished except for a few announcements that I understand will be made around July 1st. The object of this letter is to learn whether you have any assurance from manufacturers that all price readjustments shall be made by July 1st, so that the public will realize that the new prices are to continue over a substantial period.

Would it not be well to suggest to all manufacturers that while no guarantee may be necessary, it would seem highly important to the prosperity of the retail trade that manufacturers endeavor to prove to the public that **the present prices are excellent values**, that in some cases they are made at a substantial but necessary loss during the readjustment period, and that for these reasons no further changes may be expected unless they are upward?

During the past few years the banking fraternity has been led to look upon the automobile industry with the greatest respect, not alone because of its volume, but because of the energetic manner in which it has been conducted, and our high appreciation that cars and trucks are now permanent necessities in our American life. Banks generally have been liberal with their credits to the industry, curtailment coming only in a few districts, and in a few cases where the dealer was not entitled to credit, irrespective of the product he was selling.

We take pride in the fact that in ten years of financing automobile dealers to the extent of many millions of dollars, we have never had a dollar's loss except in one instance where fraud was committed.

Our interest in the retail selling field has led us to make a survey which shows

1. That there is a substantial purchasing power available for motor cars in particular, and to some degree for motor trucks, particularly in connection with new building operations that are now getting under way.

2. Buyers generally are waiting for the final adjustment of motor car prices, to be assured that when they do buy the price will not change a few weeks later.

3. It is the hope among dealers that all manufacturers who contemplate price adjustments will do so promptly and with the full understanding of the requirements of the next six or eight months.

4. While guaranteeing prices may have many bad features, the makers should endeavor to impress the public with the new values in motor cars and to show that the industry has now been stabilized after these mid-season price changes, that no more changes are probable, and, moreover, that if there should be any further price changes it would more than be offset by the reduced value of the car which the average buyer now has to trade.

From our survey of the field it would appear that the new prices represent extraordinary values in motor cars because they are so little above the pre-war prices, to say nothing of the fact that many of these new models are better equipped, better made and better finished than the products of five years ago.

While I appreciate the difficulty of concerted action by nearly two hundred manufacturers of motor cars and motor trucks in an industry as big as yours, the National Automobile Chamber of Commerce has been such a constructive force for so many years and the automobile industry is in so much better shape than the majority of trades in this country, that I hope your organization will undertake to convey to its members some of those things which I am prompted to suggest because of our high interest in the motor car sales in the eastern territory.

Can you, or through you, can the manufacturers give us any assurance of a continuation of operations by the manufacturers on the present basis of prices and values? Some certainty along these lines will materially help the dealer in his plans for maintaining his organization and sales work that would permit broader plans for financing his requirements on the part of banks and ultimately be for the best interest of the public, the manufacturer and the retailer.

Please be assured of the readiness of our bank to render every possible assistance in the solution of this problem for further stabilization of the automobile industry.

Defiance Gets Chinese Concessions

A 20-year concession to ship trucks and automotive equipment into China has been obtained from the Chinese Government by the Defiance Motor Truck Co., of Defiance, O., according to a recent announcement. Granting of this concession will entail a large expansion program on the part of the American company.

Although the details of the financial plan are not forthcoming, it is hinted that the Chinese Government will share in the profits of the business, rather than impose a duty, and that it will float a big bond issue to carry out the program.

Commercial Haulers Urge the Establishment of Parts Stations

As a result of their first annual meeting held at Milwaukee, June 30 to July 2, members of the National Association of Commercial Haulers will use every possible endeavor during the next year to increase the membership of their organization, that the constructive work that has been started may be carried on with still greater energy and zeal. Over fifty delegates, representing 79 local organizations, were present at the meeting, the delegates coming from cities representing every section of the country.

Among the principal speakers on automotive topics relating to commercial haulage were Forrest J. Alvin, general manager of the United States Motor Truck Co., of Cincinnati; M. L. Heminway, manager of the Motor and Accessory Manufacturers Assn., and I. T. Byrum, of the Trailer Manufacturers Assn.; James Menhall, of the Highway Trailer Co., and Homer Hilton, of the Winther Motor Truck Co.

Mr. Alvin laid particular stress upon the necessity of the motor truck in the modern transportation fabric. He acknowledged that manufacturers had not always sold their trucks to commercial haulers the way they should, and that the idea of selling trucks on the theory of "anything to make the sale" is all wrong. He urged a closer study of the haulage needs of every prospect before a sale was made.

Mr. Alvin pointed out that some manufacturers are very careful in selling the right truck to their prospects, and that education of the new truck user is a very necessary part of the sale to get lasting satisfaction. He urged the haulers present to give more time to properly caring for the trucks they use as a good business investment.

Referring to the propaganda and efforts to discredit motor trucks, Mr. Alvin said that only selfish interests were against it, that their efforts to legislate it off the roads was only that they might gain something personally from this result.

Mr. Heminway urged a close co-operation of the manufacturer, dealer and user of motor trucks in stopping the deluge of inimical legislation directed at the truck and Mr. Byrum pointed out many ways in which the commercial hauler may use trailers of some type as auxiliary to their motor truck fleets at a big saving in investment and operation. Mr. Menhall outlined several points that truck users should know if they are to become successful users of trailers.

The remainder of the speaking program had to do principally with haulage problems and matters of legislation affecting the commercial haulers of the country.

One result of the meeting is that the office of secretary-manager has been abolished, and in the future Tom Snyder, of Indianapolis, will act as secretary, and C. R. Collins, who has managed the association from its inception, will be enabled to devote all his time to constructive work in the field, establishing new local haulage organizations and building a stronger association throughout the United States.

The association offices will be established at Suite 201, Transportation Building, Indianapolis.

The following parts depot resolution was carried:

TO THE MANUFACTURERS OF ASSEMBLED TRUCKS:

The members of the National Association of Commercial Haulers, being users of your manufactured units in their equipment, respectfully request that you establish yourselves or through some neutral sales organization parts stations, whereby they can secure parts at fair and uniform prices for the units you are now manufacturing and for the units you have heretofore manufactured which are now considered by you obsolete, as we consider this method the only practical way in which we can, as users, get the service we are entitled to by reason of using equipment equipped with units of your manufacture. Our experience is, and has been in the past, that the distributors and agents cannot carry a complete stock of parts, and further that said distributors and agents are constantly changing and manufacturers are changing their models, and changing from one unit manufacturer to another and in some cases going out of business, and we are constantly finding that we have equipment broken down and in need of parts, with no one carrying the parts we need.

If parts stations are established and complete stocks of service parts are carried for both old and current models:

1. It will enable us, as owners and users of motor-driven vehicles, to secure genuine parts.
2. It will tend to stabilize the prices of these parts, avoiding in some cases an increase in the price of some parts of from twenty to fifty per cent more than paid to authorized parts service stations.
3. It will give us immediate delivery of parts necessary to repair broken parts of a unit, thus keeping our trucks and cars constantly in service, thus avoiding heavy losses and great inconvenience.
4. It will tend to stabilize the value of the motor trucks and touring cars containing assembled units, both for the purpose of use and resale.
5. It will eliminate the tremendous losses sustained when an agent, dealer, distributor or manufacturer goes out of business or discontinues the manufacture or sale of the truck or car we are using.
6. It will give us the maximum of efficiency and service to which we are entitled as owners of trucks and cars containing assembled units.

A committee was appointed to confer with the National Team and Motor Truck Owners' Association and the National Furniture Warehousemen's Association, to investigate and report back relative to the possibilities and probabilities of a consolidation of the three organizations.

Automobile Writer With State Association

W. D. "Eddie" Edenburn has been appointed manager of the Michigan Automotive Trade Association, according to an announcement by Guy S. Garber, of Saginaw, Mich., president of the Wolverine State's Dealers' Organization. Edenburn has resigned as Automotive Editor of the Detroit News, after having been a member of the News editorial staff for seven years. He will assume his new duties immediately and be located for the time being in the office of the Detroit Auto Dealers' Association, 4612 Woodward Avenue.

Five Resignations at Goodrich

Five resignations have occurred in the ranks of the B. F. Goodrich Rubber Co., according to a recent report. They are E. C. Tibbits, advertising manager; R. E. Hackenger, assistant advertising manager; James O'Meara, publicity chief; William Blackwell, purchasing agent and E. P. Rowen, in charge of Diamond tire sales.

To Install Highway Mile-Stone

WASHINGTON, D. C.—Largely through the offices of Dr. S. M. Johnson, General Director of the Lee Highway Association, funds have been raised for the construction of a permanent milestone in Washington, to be erected at that point from which the United States Army Motor Convoy started their transcontinental trips over the Lincoln Highway and the Lee Highway. It is planned to dedicate the milestone in question with appropriate ceremonies some time in the fall.

A delegation of prominent men connected with the automotive industry recently called on President Harding at the White House and extended to him an invitation to participate in the ceremonies at the time of the dedication, which it is thought he will be able to accept.

Philadelphia Firm to Make Asbestos Products

Under the name of the Asbestos Corporation, a company has been chartered by well-known Philadelphia business men, with a capital of \$250,000, to engage in the manufacture of asbestos yarns and products, brake linings, tapes, cloths and other textile fabrics. Machinery of the latest type is being installed in the company's plant at Belfield Avenue and Fisher's Lane, Philadelphia, and production will commence shortly.

The new company will specialize in the production of fabrics and the very finest counts in asbestos yarns for the insulating of electrical apparatus, and the manufacture of the strongest yarns for braiding, knitting and weaving in asbestos products.

Defiance Leaves the Wagon Field

The Defiance Motor Truck Co., Defiance, Ohio, has sold out all the stock and machinery of the old Turnbull Wagon Company to interests located in Montpelier, Ohio. The Turnbull Wagon Company, which was established in 1879, was the parent of the Defiance organization and carried on a large business in service on wagon parts. Since C. H. Kettering became interested in and started Defiance company 18 months ago, the wagon end of the business has been gradually divorced from the truck end. The factory now covers 15 acres of ground and is equipped for both truck and body production. J. C. Ayers, formerly of Detroit, is general manager of the company.

Chicago Exposition to Feature Truckportation

Transportation, the progress of which marks the advance of civilization, will occupy the place of honor among the exhibits at the great Pageant of Progress Exposition, to be held July 30 to August 14, on Chicago's \$5,000,000 Municipal Pier.

As it is the largest factor in man's progress, it will furnish the largest exhibit

in this history of man's progress. More than 22,000 sq. ft., nearly one-seventh of the entire exhibition space, will be occupied by the automotive section, of which Charles S. Rieman, president of the Elgin Motor Car Corporation, is the chairman. It will include passenger automobiles, trucks, tractors, airplanes, motor boats, motorcycles, tires, accessories and lubricating and fuel oils, and will be the most complete and most attractive exhibition of automotive products ever assembled under one roof.

In the educational section of the display a complete history of transportation will be shown by small working models, beginning with the old two-wheeled ox carts and progressing up through the wagon, buggy, bicycle, automobile and airplane. Some of the early models of various vehicles will be shown, clearly visualizing for visitors the strides transportation has made since history began to be recorded.

The International Harvester Company will show the first reaper, the same model which was exhibited at the World's Fair and in London, alongside one of their great modern machines, which will demonstrate the remarkable progress made in the development of agricultural implements.

Government Aid in Many Highway Projects

The Government has lent its aid to the construction of 22,030 miles of highway up to March 1, 1921, according to an announcement by the Chief of the Bureau of Public Roads, U. S. Dept. of Agriculture. On this date highways extending into every State, representing a total cost of approximately \$361,946,868, had been completed or were in a process of construction.

Highway projects are usually begun by the State, but before Federal aid is granted there is an inspection made by a Government engineer and the proper method of handling the work is recommended.

Says Business is Fine

The Clark-Turner Piston Co., of Los Angeles, recently shipped a full carload of pistons across the United States. These pistons were sold to the Westervelt Machine Corp., of N. Y. City. The interesting thing about this bit of news is that it shows a much better condition in the industry than many repairmen and dealers think exists. These pistons are not for factory equipment, but have gone to a distributor to be sold to replace original equipment. This company contends that business is there all right for any one who goes after it hard enough.

Ford Parts Reduced

A reduction on Ford parts, ranging from 12½ to 50 per cent, has been announced by the Ford Motor Car Co. The reduction will include over 400 parts and will range in dollars and cents from 1 cent to \$12.

Personal Items

H. A. Ailer, formerly representing the Garford trucks, is now handling sales for the Standard Motor Truck Co., of Detroit, Mich., in Michigan and contiguous territory.

E. H. Austin has been made manager of the Pittsburgh branch of the Bearing Service Co., which is located at 117 S. Highland Ave. Mr. Austin comes from the company's main offices at Detroit, where he was assistant purchasing agent.

H. C. Bradfield, of Detroit, has been announced as director of sales and advertising for the Yellow Cab Manufacturing Co., of Chicago. Mr. Bradfield has just resigned as president and general manager of the Bradfield Co., Detroit.

Arthur E. Davies is to continue as factory manager of the Republic Motor Truck Co., Inc., of Alma, Mich., according to recent announcement. He has been with the Republic organization for over seven years.

C. E. Gordon, for ten years with the sales department of the Timken-Detroit Axle Co., has resigned to accept the position of general sales manager of the Alena Steam Products Co., Indianapolis, Ind., manufacturer of boilers and steam engines for trucks and tractors.

E. D. Hand has resigned as vice-president and sales manager of the J. C. Wilson Co., to accept an executive post with the International Motor Co., Mack truck makers, of New York City.

J. King Harness, for the past 4½ years patent counsel for the Ford Motor Co., has resigned to resume private practice, specializing on corporation work. He is maintaining offices at 1011 Majestic Bldg., Detroit.

John D. Hess, Jr., has been announced as manager of pneumatic tire sales of the Firestone Tire & Rubber Co.

Frederich C. Horner, for several years transportation engineer of the Packard Motor Car Co., of New York, is leaving that company to spend two years in Europe in order to make a close study of transportation practice in Europe.

Frederick J. Lackens, advertising manager and assistant sales manager of the Allen Motor Co., has been appointed advertising manager of the J. P. Gordon Co., Columbus, O., who manufacture curtains, seat and radiator covers.

George E. LeViertes, formerly of the LeViertes Mfg. Co., manufacturers of Jiffy windshield cleaners, has severed his connections and is now with the Geo. E. LeViertes

Co., 218 State St., New Haven, Conn., manufacturers of E-Z Way products.

Fred McFawn, after a service of ten years, has left the Stanley Works, New Britain, Conn., to become director of sales for the Hartmann Truck Co., of Racine, Wis.

James W. O'Meara, of the advertising department of B. F. Goodrich Rubber Co., has resigned. He was in charge of much of the company's newspaper and magazine publicity and has written some very successful articles on tires. His future plans are unknown.

William R. Petze, sales manager of the branches for the Splittorf Electrical Co., has resigned to join the Sterno Corp., New York City, as general sales manager of its Automotive Accessories Division. The firm makes Sterno Canned Heat, Carbon Remover, Priming Fluid, Top Dressing, Body Polish, Fender Enamel, Radiator Cement, etc.

C. J. Reilly, for several years connected with the Firestone Rubber Co., at Akron, as sales representative, has been appointed sales manager of the Simplex Auto Lock Co., of Detroit, Mich.

Ernest J. Shassberger has been appointed advertising manager of the Olds Motor Works, Lansing, Mich. He has been with the Olds organization for four years.

Earl B. Spencer, formerly with the Pierce-Arrow Motor Car Co., has become production superintendent of the Leach Biltwell Motor Car Co., of Los Angeles, Cal.

J. G. White has been appointed district sales manager of the Sharon Pressed Steel Co., of Sharon, O., for the Detroit, Mich., district. He will maintain offices at 1214 Dime Bank Bldg., Detroit.

New Incorporations

The Desplaines Auto Co. have been incorporated at Desplaines, Ill., to manufacture and deal in automobiles, trucks and accessories. Capital is \$35,000.

The Trenton Chilled Die & Casting Co. has been incorporated under the laws of New Jersey at \$100,000 to do a general foundry business. Firm's address: Houghton and Cortlandt Sts., Trenton, N. J.

The United States Industrial Alcohol Co., of New York, and allied interest are to build an industrial plant, representing an investment of \$2,000,000, at Baltimore, for the purpose of manufacturing alcohol-burning heating devices for automobiles. A 37-acre site has been obtained.

The Leader Battery Equipment Co., Inc., of St. Louis, has opened an office at 324

Title Guaranty Bldg. This company was recently incorporated under the laws of Missouri as automotive jobbers and distributors of battery parts, equipment and general supplies.

The Texas Motor Truck Equipment Co. has been organized at Dallas, Tex., by Frank J. Grunden to distribute steel dump bodies, hydraulic and hand hoists, wrenches and cranes, radiator guards and bumpers.

The Pyramid Sales Corp., of Manhattan, has been incorporated at \$300,000 to maintain an automobile and motor truck service station.

Kil-Glar Co., Wilmington, Del., has been chartered to manufacture and sell patent shields for automobiles, trucks, etc. Capitalization \$250,000.

The Wyandotte Motor Power Truck Co. has been granted articles of incorporation at Wyandotte, Mich., with a capitalization of \$125,000.

Removals and Trade Changes

The Link-Belt Co., Chicago, Ill., has acquired all of the capital stock of the H. W. Caldwell & Son Co., manufacturer of Helicoid conveyors and power transmission machinery. Frank C. Caldwell has been elected a director of the Link Belt Co. The plant management of the acquired company will remain substantially the same.

The Dow Wire & Iron Works, of Louisville, Ky., has changed its name to the Dow Co., and has taken over the entire line of the Catskill Manufacturing Co., of Thomasville, Ga. The company will devote its attention to the manufacture of automobile specialties. The change involves no change in the company's personnel.

A. Waxman & Co., 413 North Orianna St., Philadelphia, Pa., manufacturer of mirrors and beveled plates for motor vehicles, announces a dissolution of the partnership consisting of Abram Waxman, Max M. Waxman and Marks Waxman. The business is to be continued under the present name by Abram Waxman and Max M. Waxman.

The Ranier Motor Corp., New York City, has moved from its present location to 235 West 50th St., where it will occupy the entire building, affording 15,000 sq. ft. floor space. The move was necessitated by the increase in the corporation's business.

H. G. Paro, 1412 S. Michigan Blvd., Chicago, Ill., has purchased the entire stock and patents of the Grease Pump Mfg. Co., the firm to continue under the purchaser's name. The company will manufacture a high grade line of grease pumps and other shop devices.



W. D. Edenburn

Whose services as manager have been acquired by the newly formed Michigan Automotive Trade Assn. He was for seven years automotive editor of the Detroit News.



C. W. Butterfield

New sales manager of the Apex Motor Corp., of Ypsilanti, Mich. He was formerly of the Hershell-Spillman Motor Co., and the Dyneto Electric Corp.



George H. Daugherty

Well-known motor truck advertising man who has become vice-president of Johnson, Read & Co., of Chicago, Ill.



John D. Hess, Jr.

Who has been announced a manager of pneumatic tire sales of the Firestone Tire & Rubber Co., of Akron, Ohio.

McCarthy Bros. & Wilson, Inc., of Philadelphia, Pa., who handles Philbrin Ignition, Wilmac Cables and Pedrick Piston Rings, is now in its new store, office and service station at 225 North Broad St.

The New Departure Mfg. Co. has moved its Chicago sales offices to the Peoples Gas Building, 122 S. Michigan Ave.

Literature

Coil Ignition for Motor Cars is an estimable little English treatise for the motor mechanic, owner-driver and all interested in coil ignition systems. The work is written by C. Sylvester. Beside acquainting the reader with the theory of coil ignition the book is written with a view to aiding the subject in locating ignition trouble. Published by Sir Isaac Pitman & Sons, Ltd., 2 West 45th St., New York.

Factory News and Capital Increases

The Greenfield Tap & Die Corp., of Greenfield, Mass., will purchase the entire capital stock of the Greenfield Machinery Co., Greenfield, manufacturer of cylindrical and universal grinders, and the Morgan Grinder Co., of Worcester, Mass., manufacturer of internal grinders.

The Garford Motor Truck Co., of Lima, O., reports the completion of additions to its plants which increases the total floor space to 14 acres, with machinery and equipment which will more than treble the production capacity of the company. The addition consists of an assembly unit which will have the latest improved assembly facilities.

The Luverne Fire Apparatus Co., of Luverne, Minn., report sales of Model 6 six-cylinder triple combination fire trucks to the following cities: Monroe, Wis.; Marseilles, Ill., and Amboy, Ill.

The Biggam Trailer Co., 802 First Wisconsin National Bank Bldg., Milwaukee, Wis., reports a large contract for Biggam trailers from the Available Truck Co., of Chicago. The trailer company is now in production on a 3½ and 5-ton model.

The International Motor Truck Corp. will establish a factory branch in Houston, Tex., according to a recent announcement.

The Teagle Co., of Cleveland, O., has recently closed a contract with the International Motor Co., of New York, whereby all Mack trucks will be equipped with Teagle magnetos.

The Klaxon Co., of Newark, N. J., announces a reduction in the prices of its Klaxon equipment. Push buttons and wires are to be furnished only with Klaxon 20 hereafter.

The Goodyear Tire & Rubber Co., of Akron, O., has added another 1500 men and will operate on three shifts a day.

The National Carbon Co., Inc., Cleveland, O., has announced a substantial reduction in price of all standard types of Columbia Dry Batteries. Prices were effective June 1.

The Traveler Rubber Co., of Bethlehem, Pa., has added to its stock sizes a 30 x 3½ cord tire to list at \$23.50.

The Dominion Oxygen Co., Ltd., will break ground soon for a quarter of a million oxygen plant at Montreal, Canada. The building will be 100 x 100 and will be modeled after the company's Toronto plant.

The Motor Wheel Corporation, Lansing, Mich., on June 20 paid a cash dividend on common stock of 2 per cent. Dividends of at least two per cent on common stock of the corporation have been paid at quarterly intervals since its organization.

New Agencies

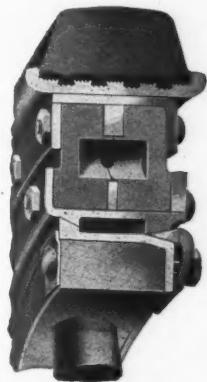
The John N. Willys Export Corp. has established general offices in Toledo with E. C. Morse as vice-president and general manager. The corporation will supervise the exportation of all Overland cars and Republic trucks.

The Laystall Motor Engineering Works, Ltd., of London, Eng., will distribute the products of the Clark-Turner Piston Co., in Great Britain and Ireland.

The Deer Path Garage, of Lake Forest, Ill., will open a new Vesta Storage Battery service station in that city.

Morand Demountable Cushion Element

The Morand Cushion Wheel Co., Chicago, Ill., states, as a matter of trade information, that its wheel, which has been on the market for several years, is interchangeable with and replaces any size pneumatic tire without wheel change. Also, that the replacement can be accomplished by one man, supplied with ordinary truck tools, in a comparatively short time. It is done by simply jacking up the truck, removing the pneumatic and rim and slipping on the Morand Demountable Cushion Element and solid



Cross-Section of the Morand Element

tire and finishing up by tightening fastening lugs.

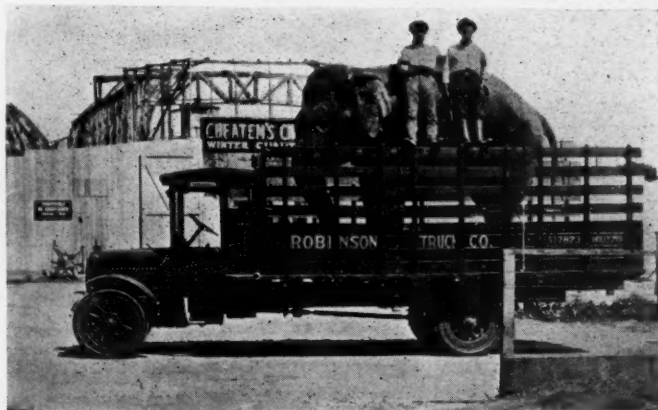
Trucks equipped with these wheels are said to provide permanent resiliency, cushion the truck against shocks and vibration and deliver big mileage.

The resiliency of this element is in a live rubber cushion which is encased by channel bands, both on the inside and outside circumferences. Study the accompanying illustration for details of construction. In action, this cushion provides equal distribution of resiliency throughout the entire circumference of the wheel. No one portion, it is said, receives the entire burden.

The Morand Demountable Cushion Element replaces pneumatics according to sizes, given in the following table:

Pneumatics		Cushions
34 x 4½	Replaced by	36 x 4
35 x 5	"	36 x 4
36 x 6	"	36 x 4
36 x 6	"	36 x 5
36 x 6	"	36 x 6
38 x 7	"	36 x 6
40 x 8	"	36 x 7
40 x 8	"	36 x 8
44 x 10	"	36 x 8
44 x 10	"	36 x 10

Even Mammoth Mammals Have Their Joy Rides Showing "Jumbo," a cinema star, being borne by truck to its next stopping place. This huge pachyderm, instead of pushing cars around as in yore, now rides in this 2½ ton truck manufactured by the Transport Motor Truck Co., Mount Pleasant, Mich.



Morand Demountable Cushion Element

NEW COMMERCIAL CARS



Announcing the Republic Rapid Transit*

THE Republic Motor Truck Company, Inc., of Alma, Mich., is in production on its new Model No. 75, the Rapid Transit Truck—a unit designed and built to answer every haulage requirement in rapid transportation.

The Republic engineering staff during the past year conducted far-reaching and exhaustive investigations and experiments

pany was first organized, over seven years ago.

Every requirement for power and speed has been carefully analyzed in advance by the Republic engineering staff, and these very important elements in a truck for rapid transportation have been incorporated in the Rapid Transit. In fact, this model is designed and built to keep

addition, the Republic Rapid Transit is furnished with a complete line of body types to suit all requirements in rapid transportation, notably the following:

Open Body, Stock Rack, Double Deck, Carryall, Screen Enclosed, Platform Stake, Panel.

All body types are furnished with either open or enclosed cabs, according to specifications.

The Republic Rapid Transit truck, with canopy top express body, and complete electrical starting and lighting equipment, is quoted at \$1395 list, f.o.b. factory, Alma, Mich. Republic officials state that this remarkable low price is naturally predicated on a large production volume, and feel confident that this truck's distinctive price advantage plus exceptional construction and general utility value will be immediately reflected in a large sales volume.

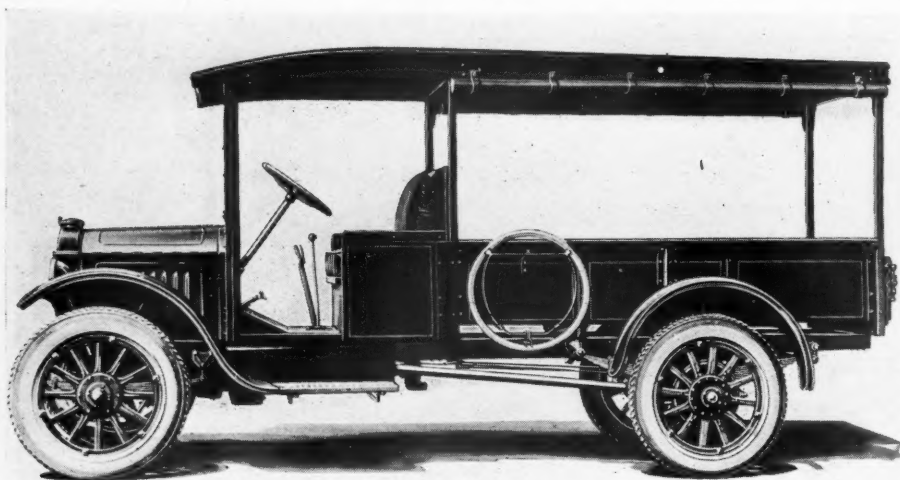
The company has laid out a comprehensive advertising and sales promotion campaign to feature this truck. Republic dealers are also using local newspapers to stimulate interest and have been supplied with very attractive posters and signs for display purposes, as well as a complete series of advance catalogues for general distribution among prospective purchasers.

The following is a resume of specifications of the Rapid Transit model with standard canopy top body:

Engine—4 cylinders, cast en bloc, detachable "L" head type. Bore, $3\frac{1}{2}$ -in.; stroke, 5-in.; 3-point suspension mounting, with very liberal bearings throughout. Efficient thermo syphon cooling system, with 15-in. fan. Design provides accessibility throughout.

Ignition—Generator and battery system with manual advance.

Carburetor—Float feed, automatic type, throttle operated by foot accelerator



Republic Rapid Transit With Express Body and Canopy Top. Equipment Includes Cord Tires, Electric Lights and Starter, Spare Rim. Price, Complete, \$1395, F. O. B., Alma, Michigan

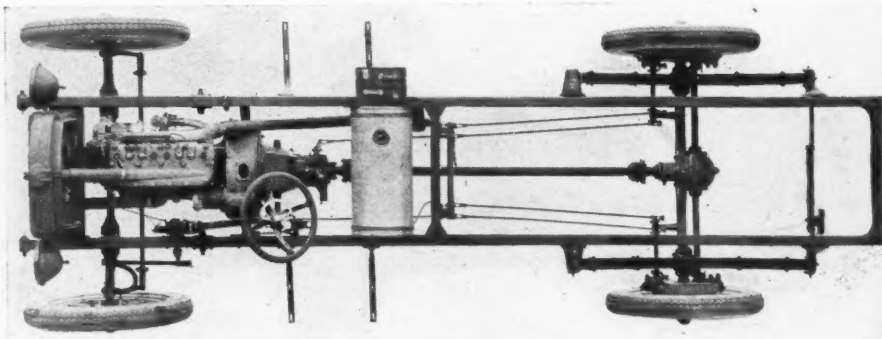
with trucks of this type now on the market, and in announcing the Rapid Transit, the Republic officials declare their positive conviction that this new truck presents many advantageous features over existing makes and a greater measure of general truck value than has ever before been given.

In designing this model the vast resources of the Republic factory have been brought to bear to make this truck dependable and economical in operation. Realizing that ton-mile cost is the final answer to all transportation problems, the engineers have built into the Rapid Transit model all necessary features of extra strength to assure the truck giving continuous dependable service in actual trucking work.

The Republic Rapid Transit is built throughout of sturdy truck size units, thus following the long-established construction policy which has been a feature in the Republic line since the com-

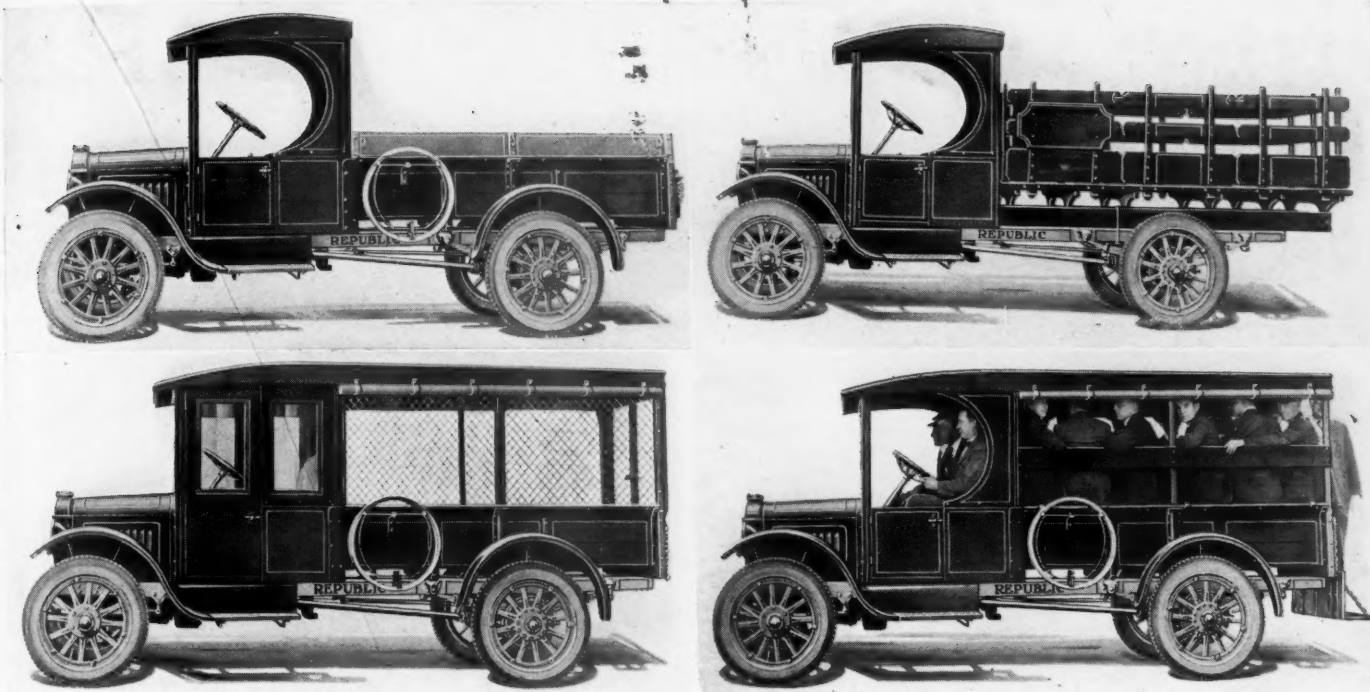
these two qualities uppermost and unflinching in daily application, the makers realizing that the prestige and sales success which are anticipated on this model will largely be based on the successful fruition of these two superimportant essentials.

Standard equipment consists of the truck fitted with canopy top express body, with open cab and complete curtain. In



Plan of Republic Rapid Transit Chassis

* Name "Republic Rapid Transit" copyrighted, 1921, by the Republic Motor Truck Co., Inc.



Republic Rapid Transit Bodies; Open Body; Platform Stake; Screen Enclosed, and Carry-All

and hand lever on steering column. Hot air supply from stove on exhaust manifold. Choke adjustment on dash. **Drive**—Tubular propeller shaft with two universal joints, enclosed in dustproof housing. **Transmission**—Sliding selective gear, three speeds forward and one reverse, in unit with engine. Center control operating in ball-in-socket joint. Ball and roller bearings throughout. **Clutch**—Multiple dry disk type, completely enclosed in bell housing. **Radiator**—Republic, detachable type, tanks and sides; removable cellular core. Very strong, built to withstand vibration and road shocks. **Springs**—Semi-elliptic, high quality spring steel. Shackles are drop-forged steel. Hotchkiss drive system. **Front Axle**—Drop-forged "I" beam section; with integral yokes. Drop-forged steering knuckles of heat-treated alloy steel. Tapered roller bearings in hubs. **Rear Axle**—Republic-Torbensen Internal Gear. Drop-forged "I" beam load-carrying member. Live axle shafts trans-

mit power to internal gears at hubs. Roller bearings throughout.

Brakes—Operating on rear wheels; very easily adjusted. Service Brakes—external contracting type, 14 in. in diam., 2-in. face. Emergency Brakes—internal expanding type.

Gear Ratios—Final: First, 17.64 to 1; second, 11.15 to 1; third, 6.3 to 1; reverse, 22.68 to 1.

Wheels—Artillery type, 12 spokes, front and rear. Demountable, detachable rims.

Tires—32 x 4½-in. cords, truck type, non-skid.

Steering Gear—Worm and split nut type, irreversible and adjustable. Transverse rod at rear of front axle. Wheel, 17½-in. diam.

Frame—Pressed steel, channel section, the design incorporating great strength with lightness.

Wheelbase—124 in.

Tread—56 in.

Weight—Chassis only, 2500 lb.; with standard canopy top express body and complete equipment, 3100 lb.

Gasoline Tank—Under seat, 14-gal. capacity; filter and sediment trap; vacuum feed system.

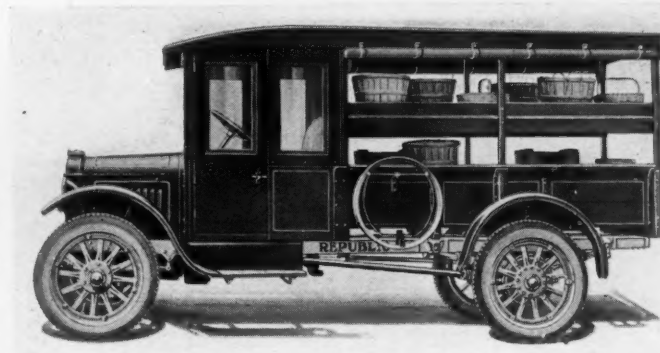
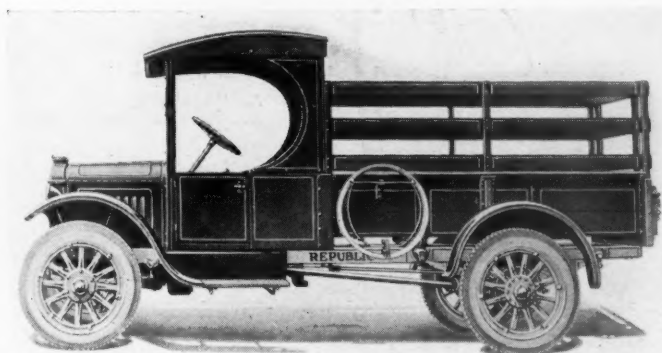
Chassis Lubrication—High pressure grease system throughout. Brake cross shafts mounted in "oil-less" bushings.

Body—Standard equipment; canopy top express with cab and adjustable ventilating rain-vision windshield. Cab and canopy top are completely equipped with curtains.

Electrical Equipment—Autolite electric generator and starting motor with Bendix drive; 6-volt battery of liberal capacity; ammeter; electric horn; electric headlights with dimmer and non-glare lenses; electric tail light; combination lighting and ignition switch located on dash.

Accessories—Tire carrier with spare rim; complete tool kit, including jack and tire pump.

Finish—Chassis, Republic Yellow, black striped; body, Republic Blue, gold striped. Fenders, running boards, aprons, radiator and hood, black enamel.



Republic Rapid Transit With Stock Rack, Also With Double-Deck Body

Acason Introduces a Three-Quarter-Ton Speed Job

THE latest job introduced by the Acason Motor Truck Co., Detroit, Mich., is a new $\frac{3}{4}$ -ton speed truck rated at from 30 to 40 m.p.h. It sells at \$1650.

Besides the feature of speed this new model is claimed to contain many innovations particularly valuable in a light delivery truck. It has a worm-drive rear axle; 110 in. loading space; Acason 4-cylinder L-head type, cast in block, three-point suspended, $3\frac{3}{4}$ in. bore and 5 in. stroke engine developing 32 hp. at normal speed, and Westinghouse starting, lighting and generator outfit.

Engine speed is controlled by a centrifugal, fly-ball type governor built integral with the engine and entirely enclosed. It operates direct from the timing gears. Ignition is accomplished by a high tension magneto and carburetion is through a Schebler. Gas is fed to the carburetor from a 15-gal. tank located under the driver's seat. This tank is equipped with a sediment trap.

The cooling system consists of a fan and water pump. The radiator, which is of the built-up type with detachable core, is protected by a special design radiator guard.

From the engine the power is transmitted through a disk clutch, completely enclosed in a bell housing, to a Fuller sliding gear transmission. This gear-set provides three speeds forward and one reverse.

The propeller shaft is a three-joint shaft provided with S. K. F. self-aligning center bearing. Final drive is through a Timken worm-drive rear axle. The front axle is also of Timken make and is of the conventional "I" beam drop-forged type. Breaking action is obtained through two sets of brakes, both being of the internal expanding type, expanding on drums on the rear hubs.

Four semi-elliptic springs support the pressed steel frame. The frame steel is of 4 1-16 in. side section, $2\frac{1}{2}$ in. flange,

and 3-16 in. material. The frame is 34 in. wide and 202 in. long overall.

Steering is through an irreversible worm and nut type steering gear equipped with an 18-in. wheel.

The wheels, which are of the artillery type and made from specially selected wood and assembled with S. A. E. bands, are equipped with 34 x 5 in. pneumatics both front and rear. The driver's seat is of three man capacity and is furnished with a spring cushion, well upholstered.

All the controls are within easy reach of the driver. The speed and brake levers are mounted in the center of the chassis. An accelerator is provided and hand spark control is provided on the steering column.

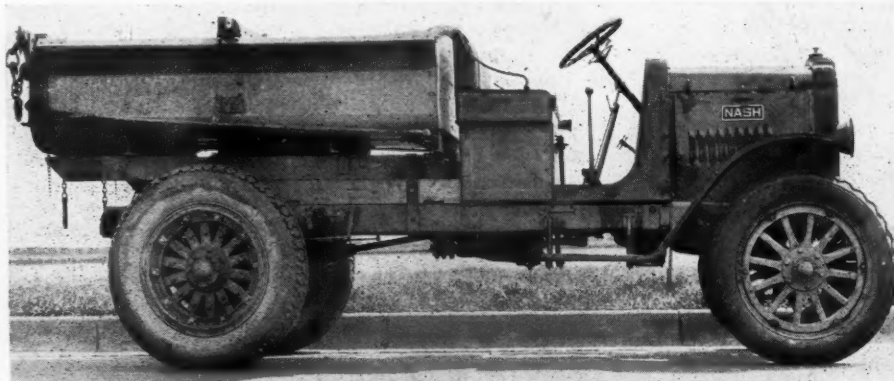
The standard equipment consists of the following: Westinghouse starter, electric lights, generator, Willard 80 hour battery, Boyce motometer, three oil lamps, mechanical horn, jack, oil can, and complete set of tools.

Two and a Half Ton Truck for Road Work Added to Nash Line

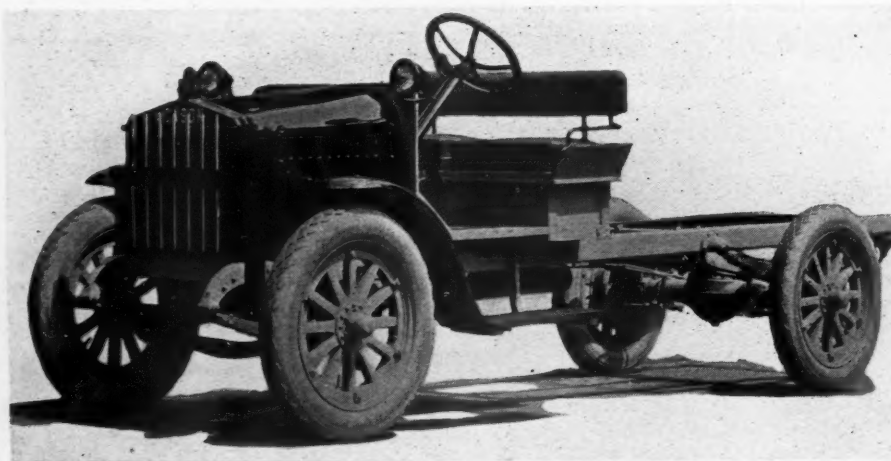
ANNOUNCEMENT is made by Charles B. Voorhis, vice-president and general sales manager of The Nash Motors Co., of the addition to the Nash line of a two and one-half-ton truck, designed particularly to meet the requirements of highway construction. The truck has a wheelbase of 121 in. and in addition to road building

work it is adaptable as well to service in other fields such as the hauling of coal or in any business where a short wheelbase truck is necessary.

Other trucks in the Nash line are of one-ton and two-ton capacity. It is understood that decision on the part of the company to build a truck of the two and one-half-ton, short wheelbase type, came



Special Two and a Half Nash Contractor Model



Latest Acason Job. It is Rated at Three-Quarter Ton and Sells at \$1650

in response to requests on the part of Nash distributors and dealers. This truck was designed by Nash engineers after a thorough investigation of the requirements of the road building field.

The Nash truck for road building work may be equipped with a two batch dump body or with the conventional type of rear dump body with horizontal hoist which can be divided into two sections of equal carrying capacity. The "aggregate" or load may thus be dumped directly into the skip of the mixer, an advantage that is distinctly economical, for in shoveling from the ground to the mixer laborers frequently gather up large portions of surface dirt. Also contractors declare a truck of this type will automatically eliminate as many as eighteen laborers

on an ordinary road-building job in the feeding of the mixer.

The Nash two and one-half-ton truck is equipped with pneumatic tires which means that it will not tear up the sub-grade. Its short wheelbase makes it possible for the driver to turn around on the sub-grade, an advantage that appeals particularly to the road-building contractor.

Wilson Standardized Truck Cabs

Successful standardization of truck cabs and bodies is a recent achievement of the Wilson Body Co., Detroit, Mich. The new line, it is said, will result in a large saving to every truck builder.

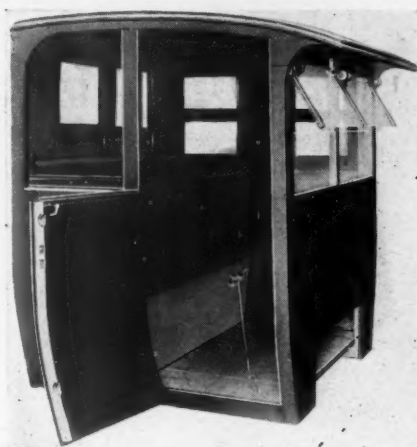
Both cabs and bodies are manufactured in sections, on a quantity production basis, to fit any chassis design. There are two types of cabs, the open cab, with swing doors and curtains, and the closed cab, with sliding doors and glass windows. The line comprises two sizes, a 1-2-ton and a 3½-5-ton size.

The truck bodies are rigidly built upon steel frames with hard-wood panels. They combine pleasing appearance with ample strength for severe service.

The feature of this standardized line is that it enables the truck builder to save in a number of ways. In the first place quantity production in an efficient plant is said to make possible a low price. Other money saving features are as follows: Cabs and bodies are shipped "knocked down" at a great saving in freight charges and in storage and factory space. As all types and sizes are assembled on standard fixtures, it is not necessary to carry an expensive stock of special parts. And final assembly is a simple operation readily performed by unskilled workmen.

As both are furnished in priming coat, they are ready for final paint the moment they are set up.

Considerable attention has been devoted in designing the cabs to increasing the efficiency of the driver. Their rugged steel construction assures safety, and the unusually comfortable seat and back cushions add to comfort.



Completely Assembled Wilson Cab

Fontaine Equipment for Brick Haulage

The new models of the Fontaine demountable truck bodies designed for brick haulage, manufactured by the American Truck Body Co., Inc., Martinsville, Va., contain new improvements.

The Fontaine delivery system enables the truck body to be loaded at a convenient place in a plant and also releases the truck for other service. When the body is loaded the truck picks up loaded body and carries it to its destination.

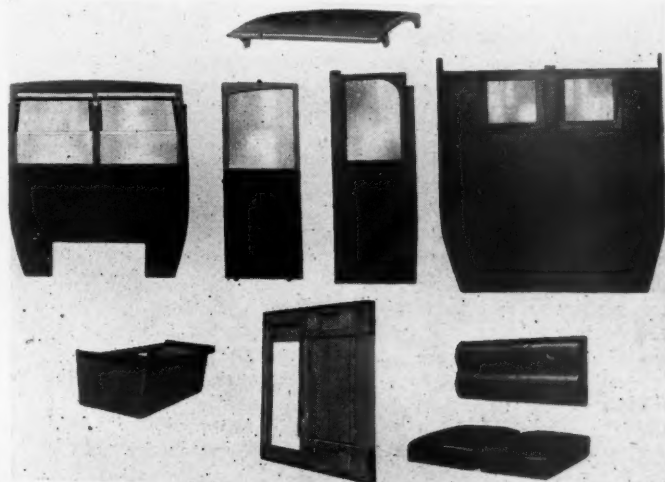
The equipment consists of a frame, with power hoist, cradle and two detachable bodies with pallets. The frame is bolted to the chassis of the truck by U bolts. This frame acts as the support for the cradle.

The cradle moves back and forth on the frame in such a manner that the body may be set on the ground and then car-

Showing Manner in Which the Fontaine Equipment Discharges a Load of Bricks Into a Neat Pile



Wilson Standardized Truck Cab Disassembled Into Its Various Units.



ried back on the truck in the proper position for hauling. The body is not lifted as a dead load, but is simply pulled over the arc of a circle. The hoist is self-locking and its operating power is derived from a power take-off on the truck.

This equipment can be secured for all makes and models of trucks and ranges in price from \$860 for a two and a half-ton truck to \$1300 for a five- or six-ton truck. The brick capacity of these bodies range from 1000 to 2000.

American Truck and Trailer Undergoes Reorganization

The American Truck and Trailer Corp., better known as A. T. C. O., has reorganized. Recently the board of directors of the above corporation elected new officers as follows:

J. H. Mitchell, president, formerly with Moline-Knight and Velie Motors Corp.; J. G. Tice, secretary and treasurer, formerly with Cleveland Car Co.; H. O. McClain, assistant secretary and chief engineer; Geo. Kremer Danforth, vice-president. The officers of the above corporation are all new with the exception of Mr. McClain.

Mexico Receives 101 Trucks From U. S. During May

Mexico led the field in domestic exports from the United States in completed commercial cars during the month of May, 1921, according to the report of the Bureau of Foreign and Domestic Commerce, Washington. A total of 101 were shipped, representing \$143,101. Canada received 83 this month, with Japan 14. The total trucks shipped were 259, representing \$442,899.

Expenditures of \$1,500,000 in the next 20 months to complete the motorization of the fire department were recommended for Chicago by John F. Cullerton, business manager.

A new method of extracting aluminum from a certain mineral has been discovered in Japan, which should prove of great industrial import to that country.

Care and Storage of Wood Wheels for Motor Trucks

Things to be Considered in the Maintenance of Wood Wheels How Hubs Should be Fitted. How to Protect Wheels in Storage

IN the third of a series of articles published by the Automotive Wood Wheel Association, of Chicago, Cornelius T. Myers, M. E., brings out some interesting facts regarding the care after manufacture and how wood wheels should be stored. This article treats the subject very exhaustively and shows that the art of automobile wood wheel making has not been acquired since the inception of the automobile but is the result of centuries of painstaking and devoted attention of many able but obscure mechanics.

Under the chapter on Wood Supply an interesting situation is brought to light, on which Mr. Myers writes as follows:

"A condition which arose in 1917 and 1918 surprised and worried a great many people who built and operated motor trucks. Some of the wood wheels soon loosened in service; they squeaked ominously under the heavy loads of goods and munitions, even if they did not go to pieces. Unusual complaints began to come in and careful manufacturers made inquiry as to the reason for them. The reasons were not hard to find if one looked in the right place. The U. S. Government had requisitioned large quantities of the hard woods that wheel makers had depended upon for their supplies. At the same time the Government called upon the wheel makers to build more wheels than before and to produce them more rapidly. This necessitated the use of wood stock that was not thoroughly dried. The policy was doubtless advisable on the part of the Government to meet the urgent war conditions in France, where it was not expected that the trucks and cars would be in service anywhere near the years of time demanded by commercial usage; neither was it necessary to have as dry stock for service in France as for this country, because of the more humid atmospheric conditions in the war zone. (Reference will be made later to the effect of atmospheric conditions on wood, especially to the hard woods used in wheels.) Automobile and truck manufacturers in this country had to take what was left after the Government requirements were filled, and naturally got some material that was not well suited to its work. Reliable manufacturers of wood wheels warned their customers of this, but as with the customer it was a case of take that or nothing, practically anything available in the way of wheels was snapped up, and wheels of other materials or types were also ordered so as to insure production of vehicles. The writer has personal knowledge of several instances where large contracts for other types of

wheels were placed in spite of the preference of the buyer for wood wheels, because of the difficulty in securing good wood wheels at that time.

"The vast production of wheels called for in the past six or eight years has revealed that there are right and wrong ways of making any kind of wheel; and a shortage of proper wood for these wheels has been predicted. A large impetus has thereby been given to the development of metal wheels of many kinds. Those who are well informed say that there is no liability of a wood shortage, with the more scientific methods of lumbering and manufacturing now coming into use, and with the reforestation program that is under way. The wood shortage bug-a-boo gained most of its recognition during '17, '18 and '19, due to war conditions which were, of course, abnormal; and it was based on the use of hickory, whereas many other kinds of hard woods are now extensively used, thanks to improvements in kiln-drying and more scientific knowledge of wood structures and treatments."

Following this are paragraphs detailing the functions of the wood wheel; how it protects the car or truck mechanism from serious damage because of the vibration absorbing qualities of wood; why it is necessary that moisture must be removed from wood to give it the physical qualities which make it fit for use in wheels, etc. The shrinkage of wood; the characteristics of hard wood, etc., are each taken up in this article in their order.

Proper Drying Essential

The following extracts on kiln drying will give the reader an idea of how the wood is dried before being converted into wheels.

Wood is said to oven-dry when continued oven drying causes no further loss of weight. In their green state the hard woods used in wheel making have a moisture content of 60 per cent to 80 per cent of their oven-dry weight, and weigh roughly from 60 per cent to 80 per cent more than when they are in an oven-dry state. In other words, 35 per cent to 45 per cent of the weight of a green hard wood log is water.

Felled wood exposed to average atmospheric conditions gradually dries, the air taking up its moisture. First the cell cavities slowly give up their moisture. This evaporation goes on until the cell cavities are emptied of the minute bodies of "free water" they contain. All that remains is the moisture actually absorbed by the fibres of the cell walls, which are still saturated with the "hygroscopic moisture." Wood in this state is said to

be at its "fibre-saturation point." Up to this time the wood does not appreciably change in size or in physical characteristics except as to weight, which of course decreases considerably as it will now contain but 25 per cent or 30 per cent of moisture instead of over 60 per cent.

Further drying of the wood is necessary in order to increase its strength and hardness, increase its durability, enable it to take and hold paint, and in general to improve its condition for the purpose intended. As this drying progresses beyond the fibre-saturation point, the cell walls give up the moisture they have absorbed, and in so doing they shrink and harden. Under natural conditions this drying process will continue until the amount of moisture in the wood corresponds to the average humidity condition in the particular locality. In our eastern and north central states, for instance, the moisture content of wood will become stabilized somewhere in the neighborhood of 14 per cent for what is known as thoroughly air dried stock. In the arid, southwestern states it will contain a still lower percentage, while in the former war zone of France the wood will normally contain considerably more than 14 per cent of moisture. Of course unpainted wood that is exposed to rain and snow will absorb considerably more than 14 per cent, depending upon the dimensions of the piece and the extent of the exposure.

Wood stock for automobile and motor truck wheels is kiln dried down to 3 per cent to 5 per cent moisture content. In the wheel manufacturing process the stock reabsorbs moisture up to about 8 per cent, which condition has been settled upon as the best practice after many years experience in making all kinds of wheels.

Durability

With reference to durability, there are several phases to be noted when it comes to considering the effects that various moisture contents may have on the wood. If wood is not protected, first the surface and later the interior of the wood piece is exposed to attack and decay; edges exposed to wear and pressure soften and break down, and the useful life of the wheel may be considerably shortened. Again, under average working conditions, the wood of motor vehicle wheels will absorb moisture at times in such amounts as to cause a perceptible swelling of the felloe and of the ends of the spokes that are held between the hub flanges. This may set up a pressure that will cause the wood to take a small permanent set at points where unit pressures are considerable—for instance, between the end of the

spoke and the felloe, between the hub flanges and at the mitre joints of the spokes.

So long as the wood holds this extra moisture the wheel will remain tight and serviceable; but when, perhaps months later, the wood dries out again to an appreciable extent it loosens up a little, because when shrinking it shows the effect of the permanent set referred to above. The wheel will then squeak, for, as it revolves, the dry spokes rub slightly against one another or move a trifle in the felloe. If this rubbing continues, abrasion and wear take place and sooner or later the wheel becomes unserviceable.

There is another condition to be considered, and can best be exemplified by referring to the experience of Gen. Pershing's army in Texas and Mexico in 1916. Hundreds of motor trucks of all brands and vintages were hurried to the border to operate with the army. The experience of the men in charge of these trucks was extremely interesting. Among other things, many of the wood wheels of these trucks became loose and creaked ominously—some of them went to pieces—those which did not have proper paint protection. The wood in the poorly painted wheels which went to the border probably contained 10 per cent to 14 per cent of moisture which promptly deserted in favor of the more engaging atmosphere. The wood shrunk accordingly. Therefore, if unprotected wood wheels are to be shipped indiscriminately into arid climates, shrinkage and looseness must be expected.

Protection

If wood is subject to continuous change under atmospheric conditions, how can we explain the remarkable service given in all parts of the world by literally millions upon millions of wood wheels under passenger cars and motor trucks, as well as the much greater number of wheels used on other vehicles of many types? The answer is simple and known to all—PAINT; in other words, a protective coating. This coating preserves the surface and thereby the interior; it also retards to a large extent the absorption of moisture by or release of moisture from the wood, so that it will not appreciably change in dimension, or so that the very slight changes will be well within the elastic limit of compression.

Referring again to the border experience of the army, there were thousands of wood wheels that gave no cause for complaint because they happened to have been carefully painted. There are thousands of wood wheels in the arid south-

west today that have been in daily service over long periods of time and which have neither shrunk nor loosened.

It is of considerable importance therefore that the automobile and motor truck industries be acquainted with what should be done by the wheel manufacturer to give such protection to the product as will more or less stabilize its condition until it is ready to be assembled under the car or truck. It is of importance that the assembler take certain precautions to see that when the product goes out into the hands of the user it has such added pro-

close the surface cells so that it is difficult for moisture to enter. These coats of primer also form the basis for the succeeding coats of paint and varnish, but are applied primarily to give the wheel surface protection while being shipped to the truck manufacturer, while stored prior to assembly, and during the road test of the truck under which it is assembled. Some wheel manufacturers omit the oil treatment but apply three coats of primer, and some manufacturers use primers of a special formula, but all are applied to keep the moisture content of the wood at about eight per cent.

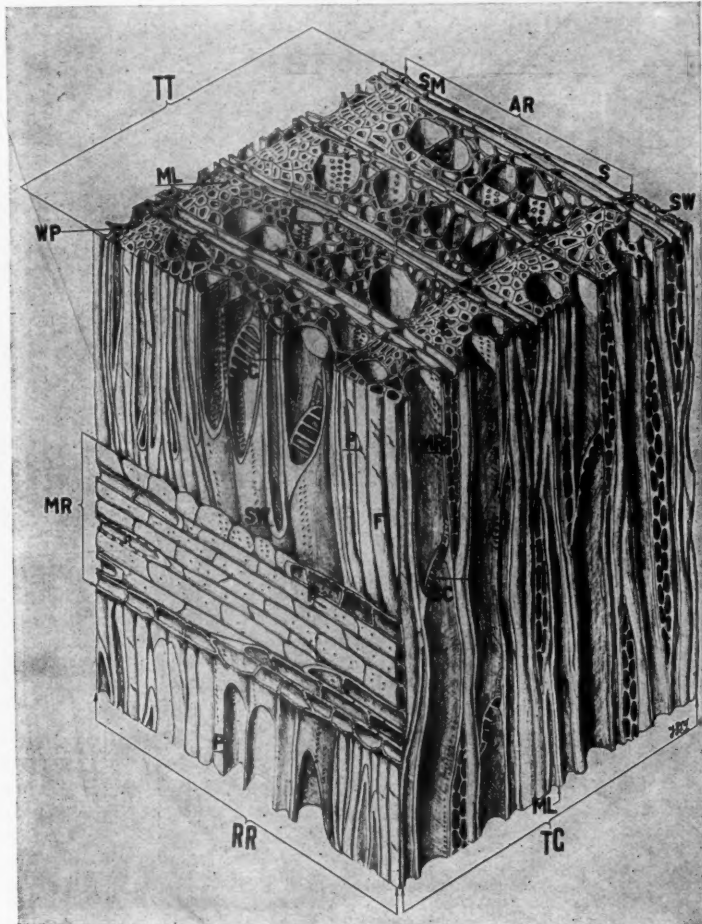
Care After Manufacture

When the truck comes in from a test run the wheels should be washed with cold water and allowed to dry thoroughly. They should then be touched up wherever the paint has been chipped off and later they should receive a coat of paint or primer before the truck is shipped. The wheels will now have received three coats of paint and an oil treatment and are ready for the final coat of paint, and the coat or coats of varnish which are applied by the owner when the body is mounted on the chassis. They have received a protection that renders them practically impervious to moisture, and will not shrink or swell, except under very unusual conditions. If the truck owner takes any care whatever of these very important, but often neglected, parts of his vehicle, they will get another coat of paint or varnish every six to twelve months, depending on the wear and tear on the paint. Ordinarily reasoning on the part of the truck owner, suggest that places where the paint becomes scarred or chipped, should be touched up promptly. For these holes

in the protective coating allow moisture to be absorbed or given out—very slowly, it is true, but if they are allowed to grow larger and increase in number the effect increases also, and the wheels will ultimately take damage if the atmospheric conditions are unfavorable.

It might seem from the above that wood wheels need more care and attention than those made of other materials, but this is not the case. The main part of the protection is applied by the wheel manufacturer, who does this so that the vehicle builder will not have to exercise undue care in storing and handling them. The truck manufacturer simply adds the usual coat of paint or primer when he paints the rest of the chassis. When properly painted, the wheels will last indefinitely, in fact, the reputable wood wheel manufacturers guarantee their product for

(Continued on page 78)



*Highly Magnified Block of Wood (Hardwood)

tection as is necessary. And it is of importance that distributors and dealers understand the characteristics of wheels so that they can pass the word along to customers, and thereby render real service.

In the plant of the wheel manufacturer, the motor truck wheel as soon as assembled, is treated with a preparation of linseed oil. As soon as the oil has been absorbed by the dry wood in the spokes and felloes a coat of primer is applied, this consisting as a rule of pure white lead, blue lead, or 98 per cent pure red lead ground in linseed oil and suitably thinned and colored. When this primer has dried, a second coat is applied and allowed to dry before the wheel is shipped. The linseed oil preparation is designed to penetrate the wood surface and make it difficult for the adjacent cells to absorb moisture. The two coats of primer fill up and

*Tieman—"Kiln Drying of Lumber," Lippincott, Pub.

The Motor Truck as an Aid in Fighting the Gipsy Moth

THE discovery of the Gipsy Moth at Somerville, N. J., during the last of June, 1920, necessitated prompt action on the part of state authorities in order to prevent the pest from spreading over the entire state. The Gipsy Moth, as New Englanders know, is a serious pest of orchard, shade and forest trees, and in severe infestations, trees may be completely stripped of foliage before the end of June. Unless checked in some way, enormous damage is bound to result. In the New England area thousands of trees are dead as a result of such defoliation. At the present time a total of \$1,000,000 is being spent each year by the New England States and the Federal Government in order to hold this insect in check and to prevent its spread.

Realizing the danger to New Jersey's large orchard, shade and ornamental plantings, the State Legislature on November 8, 1920, appropriated \$112,000 for immediate use in fighting the moth. With this sum it was possible to put a force of 100 trained men, mostly borrowed from the Federal force in New England, in the field at once. These men scouted the entire territory adjacent to the centre of infestation and it was eventually found that the moth had spread over an area of about 175 square miles. The egg masses were killed, as they were found, by being painted with creosote. After locating and killing the eggs, the next step is spraying with arsenate of lead, all foliage in the vicinity where eggs were found. In this manner caterpillars hatching from eggs which were missed by the creosote should be killed before reaching maturity.

For this purpose, nine Ward La France trucks each equipped with Fitzhenry-Guptill spraying apparatus were purchased by the State of New Jersey and are in use at present. These trucks have a carrying capacity of 3 tons, exclusive of the weight of the sprayer body and have such oversize parts as are necessary to stand the double strain of propelling themselves while loaded to their full capacity and

spraying at full pressure. The sprayer pumps are driven from the main drive shaft, the drive being capable of transmitting the full engine power. Each pump is a single acting triplex plunger type, having cylinders with $3\frac{1}{2}$ in. bore and 4 in. stroke and the speed is regulated so as to give a delivery of fifty gallons per minute at a pressure of not less than 600 lb.

It often happens that a line of pipe and hose is laid for at least 2000 ft. because of the fact that it is impossible to drive the truck up to the trees to be sprayed. In fact, it is sometimes necessary to lay practically a mile of pipe and hose. On one of these tests, where practically the same length of pipe and hose was used, it required a pressure of 800 lb. at the pump to

develop 250 lb. pressure at the nozzle, due to the loss of pressure because of friction.

The Ward La France truck is equipped with a slow speed high torque engine of $4\frac{3}{8}$ in. bore and $5\frac{3}{4}$ in. stroke. The solution tank which is made of clear white pine has a capacity of 400 gal.

Each machine is furnished with 2000 ft. of 1 in., 8 ply, rubber lined, smooth waterway, rubber covered, spray hose and the hose and couplings are guaranteed to stand a test pressure of 1000 lb.

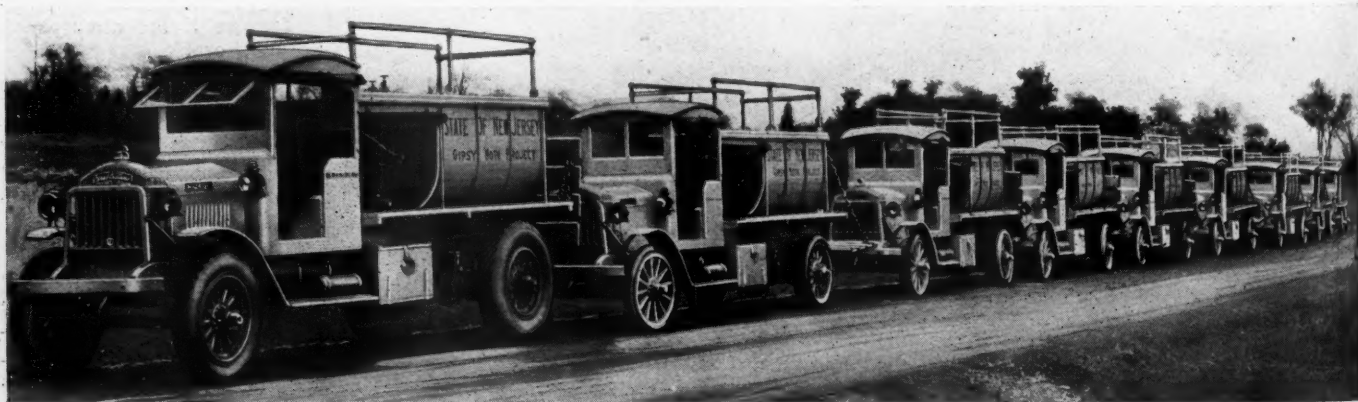
The Ward La France truck and the Fitzhenry-Guptill spraying equipment was chosen to undertake this difficult work only after a commission from the State of New Jersey visited the Ward La France factory in Elmira and the Fitzhenry-Guptill factory in Boston. The commission consisted of men from the State Entomology department and from the State Engineering office.

These high pressure spraying machines are necessary in order to apply the poison mixture in a finely divided mist to the tops of the tallest trees, even if several thousand feet of hose have to be used. All foliage along roadsides, wooded areas, and private plantings in the territory will be kept covered with arsenate of lead while the caterpillars are feeding. The period of incubation of the moth egg is approximately forty days. This means that an immense amount of work will be required from each machine, and if the time is cut shorter by rainy weather, even more work will be required by them. Only by having the spraying equipment mounted on motor trucks is it possible to cover the infested area in this short period of time.

All of the control work is being conducted jointly by the New Jersey Department of Agriculture and the United States Bureau of Entomology, and the experience of the Federal men gained by long association with the work of fighting the moth in the New England States is reflected in the satisfactory progress made in New Jersey during the past several months.



The Spray is Forced to the Top of the Tallest Trees



Equipment Used by the State of New Jersey to Fight the Gipsy Moth

Are You Giving the Truck

A THOROUGH INSPECTION

Instead of the "ONCE OVER"?

The Wise Dealer is Carefully Checking Up Every Truck Before It Goes Into Customer's Hands. Dealer Must Play Fair With Manufacturer

By C. P. SHATTUCK

IF a unit, or a component part thereof, is not correctly assembled or adjusted and through oversight gets by the inspector of the manufacturer and develops trouble in the hands of the purchaser, to whom should the repair expense be charged? Of course, if the trouble develops within the warranty period, and is due to "defect of material or workmanship," it is up to the truck manufacturer. In such event the owner passes the trouble to the dealer, who takes it up with the manufacturer. The last

named then seeks adjustment with the unit or part maker.

But—there are minor troubles which if neglected at the start, sometimes develop into major troubles. For example: The steering gear may be stiff and require considerable energy to turn it. The dealer, on testing the chassis, discovers the trouble to be that the support of the steering column is too tight or at such an angle as to cause a binding action. It may take an hour to remedy the fault. Or the brakes may drag or the control

linkage bind, which may require another hour or two to remedy. The action of the clutch may not be all that it should be. There may be a slight leak in the fuel line. Bolts and nuts of some units may be loose. Certain components may not be lubricated.

It has been the custom with the average dealer on receiving a new chassis to go over same to see that oil is where oil should be and grease where grease is essential. Some go further and tune up and test out the chassis before delivery

INSPECTION REPORT			THE OHIO GENERAL MOTORS TRUCK CO. CLEVELAND, OHIO		<input type="checkbox"/> FREIGHT <input type="checkbox"/> BOAT <input type="checkbox"/> DRIVEWAY	
MODEL	CHASSIS	MOTOR	RECEIVED	192	VIA	
Asle—Front		Distance Rods				Carburetor
Asle—Rear		Drive Shafts				Magneto
Wheels—Front and Rear		Universal Joints				Spark and Throttle Control
Tires—Front and Rear		Body—Cab—Seat—Windshield				Motor
Springs—Front and Rear		Hood—Dash				Water Pump
Steering Gear		Gas Tank				Oiling System
Transmission		Fenders				Starting and Lighting System
Clutch		Muffler				Tool Equipment
Brakes		Radiator and Cooling System				Frame
REMARKS:			ABOVE CHASSIS INSPECTED BY ME _____ 192			
			INSPECTOR			
			NOTES			

Form 9042		This Space for Factory Use		Reason for Inspection:	
Ins'd	Revised	Inspected	Revised	Inspected	Revised
General Motors Truck Co., Inspection Report No. _____					
OWNER _____		St. or City _____			
ADDRESS _____		Inspector _____			
BUSINESS _____		City _____			
		Driver _____			
		Model _____			
Body	Wheels	Daily Mileage	Truck in Use Yr's	Mo's	Chassis No.
1. IF O.K. CHECK HERE	IF NOT O.K. STATE TROUBLE	2. IF O.K. CHECK HERE	IF NOT O.K. STATE TROUBLE		
1. Front Axle		15. Oil Supply			
2. Front Wheels		16. Fan and Belt			
3. Front Tires		17. Water Pump			
4. Front Springs		18. Propeller Shaft			
5. Rear Axle		19. Frame			
6. Rear Wheels		20. Seat and Dash			
7. Rear Tires		21. Hood			
8. Rear Springs		22. Spark & T. Controls			
9. Steering Gear		23. Radiator			
10. a. Foot Brakes		24. Hose Connections			
10. b. Hand Brakes		25. Fuel Tank & Line			
10. c. Clutch Control		26. Muffler			
11. a. Clutch		27. Wiring			
11. b. Transmission		28. Lamps			
11. c. Gear Shift		29. Fenders & Steps			
12. Radius Rods		30. Mud Pan			
13. Carburetor		31. Battery			
14. a. Magneto		32. Tool Equipment			
14. b. Spark Plugs		33. Special Equipment			
14. c. Generator		34. Lubrication			
14. d. Starting Motor		Additional information below. Refer to items by number			
14. e. Starting Switch					
14. f. Ammeter					
15. a. Engine Power					
15. b. Carbon in cylinders					
15. c. Compression					
15. d. Main Bearings					
15. e. Conn. Rod Bearings					
15. f. Wrist Pin Bearings					
15. g. Timing Gears					
15. h. Valve Tappets					
15. i. Oil Leaks in Engine					
15. j. Oil Pump					
If necessary use reverse side for additional information.					

Left: Form Devised by Cleveland Truck Dealer for Noting Condition of Chassis Received From Factory

A detailed report is made of all units and equipment and a copy of the report is forwarded to the factory. By adopting the suggestions made on these reports the factory can readily check up carelessness in assembly or faulty design.

Right: Form Compiled by a Truck Manufacturer and Which May Also be Used When Inspecting Truck in Service

to a customer. Others carry out a very rigid inspection, believing that the cost of same is well warranted, that the customer should receive his chassis in as near a perfect condition as possible. Other dealers, particularly distributors, see that a chassis is right before turning it over to the sub-dealers. This is service to the sub-dealer and service to the buyer.

Factory and Parts Makers Benefit

Those dealers and distributors who practice the policy of having each unit right and functioning as it should before delivery, are rendering the factory and parts maker a service when they maintain a record of this work. The truck manufacturer desires to know, or at least he should, if any of his employes or inspectors are allowing work to get by that should not. The unit maker also should welcome any specific information as to his product not being properly assembled or adjusted at his plant or at the factory of the truck manufacturer.

During the war, trouble developed more or less through inspections not being as rigid as in normal times. As a result many dealers were forced to adopt careful inspections as previously described. Some are adhering to the plan to this day and a number of factories are encouraging their big dealers to keep a record of such inspections and to advise the factory when faults or troubles are encountered. These troubles are reported to the proper departments at the factory or unit maker and the information supplied by the dealer is extremely useful in running down the

fault and eliminating it. If it is a case of careless workmanship or faulty inspection, it is traced to the department and employee. If design, the report is passed to the engineering department.

Among the distributors to adopt an inspection report is the Ohio General Motors Truck Co., Cleveland, Ohio. This concern during the war devised the inspection form shown herewith and on it was recorded any trouble with the new chassis. The form provides for noting the model and chassis number, engine number, date received and how shipped; that is, whether by freight, boat or a drive-away. When the chassis is received it is gone over very carefully and a report made. This report must be passed on by the foreman. The reports are kept in duplicate, the original by the dealer and the copy is sent to the factory or filed until a sufficient number are in hand to warrant taking up any particular trouble with the factory.

One distributor informed the writer that the factory adopted the inspection plan or form and that the service manager stated recently that through the reports he has been able to eliminate the troubles reported, and that later reports showed complaints lacking on the same subjects.

The inspection report can be made to serve a very useful purpose if honestly and intelligently used by the dealer. The form should be checked accurately and fairly when making the inspection. If the factory is at fault because certain parts were not properly tightened or lubricant is missing, such a report should

be made. But it is not fair to attempt to pass the buck to either the factory or the parts maker for a fault not theirs and which is sometimes done.

The great value of the inspection is to insure the purchaser receiving his chassis in proper operating condition and that the dealer knows that it is right. This will avoid to a great extent the possibility of the buyer making claims he is not entitled to make. Of course, the inspection has a value to the factory and unit maker if the reports are fair. The dealer and distributor can aid both by keeping an honest record of faults and troubles and co-operating with the factory in ironing out these troubles. But the dealer must approach the factory in a spirit of co-operation, with the idea of aiding in solving the problems and not with any thought of being recompensed or getting credits.

Of course, if flagrant faults develop, the dealer is warranted in taking them up with the factory, and if the inspection report is fair the matter can be adjusted to the satisfaction of all concerned. If the dealer is obliged to do work that should have been done at the factory, there is every reason to believe that the manufacturer will credit the dealer for such work. But the dealer must lay his cards on the table and be fair to the manufacturer as well as fair to himself. Properly used, the inspection form will do much towards eliminating the minor faults as well as bringing about a better co-operative spirit between dealer and manufacturer.

DID YOU READ THE ARTICLE ON ACCOUNTING IN THE JUNE ISSUE?

By C. P. SHATTUCK and N. W. KRAEMER

THE need of an accounting system and how to distribute the various items entering into the overhead were discussed in the June issue of "The Commercial Car Journal." The article in question dealt more particularly with costs of the service station, explanation being made as to how the burden rate could be figured and changed to meet varying costs. To complete the article two additional forms are presented, one being to cover sales of new trucks for a month and the other a comparative profit and loss and balance sheet statement. Both are of the loose leaf type and are necessary where a branch or branches are maintained. The actual size of the loose leaf sheets is 14 x 17 inches.

The monthly sales report provides for a record of the number of the truck, name of purchaser, address, vocation and date of delivery, facts essential to the maintenance of sales records. Provision is made for recording a sale where settlement has not been made with factory, also allowance and make of truck traded-in. Columns are provided for freight and insurance, war tax, and selling price. The

total is carried out. The columns are added and the total gross sales obtained.

The lower half of the form is given over to recording the cost of truck, its number, cost of body, hoist, painting, lettering, special equipment or other extras. Freight and insurance as well as war tax and salesman's commission are provided for. The total is given. The total cost of sales is then determined and the gross profits learned.

The Comparative Balance Sheet

The comparative balance sheet provides for listing the assets, these including properties, current assets, accounts receivable and deferred charges. Under properties is listed land, building, machinery and equipment, furniture, tools, etc. Under current assets are new trucks, used trucks, part, work in process and garage supplies. The various items are given as at January 1, or inventory time, and as is at present time or that of making a balance. Totals, of course, are carried out. Liabilities are entered in a similar manner.

The comparative profit and loss account will afford the dealer opportunity to glean

some very pertinent and interesting information, for among other data supplied will be the total sales of trucks, parts and used trucks for the month, for the year and the previous year. The cost of sales is also given in detail. The totals represent gross profit. The selling and general expenses are grouped and their totals carried out, and provision is made for other expenses such as income taxes, etc.

The value of the forms presented herewith is obvious. The first-named gives the cost of sales and the gross profits, whereas the second-named form enables the dealer to note where he is standing, and to compare profits or losses with previous periods. The various items of expense are before him and any decided increase can be investigated if desired. The figures serve as a check on the various departments and prevent what might otherwise be a serious loss. The balance sheet is also of value to the banks. With these monthly statements before him, and a careful study of the various items, and a comparison with previous periods, the dealer should not go wrong for over 30 days.

----- MOTOR TRUCK CO. -----														BRANCH	
SALES REPORT FOR MONTH OF														19	
TRUCK NUMBER	NAME OF PURCHASER			ADDRESS		VOCATION		Date Delivered	If Truck Sold and No Settlement Made No Payment Due When General Remarks	If Truck Traded on Trade-In, State AC- cruator and Make	FREIGHT AND INSURANCE	SELLING PRICE	WAR TAX	TOTAL	
								TOTAL GROSS SALES							
YOUR PURCHASE PRICE	TRUCK NUMBER	COST OF CHASSIS	BODY	HOIST	PARTING	LETTER- ING	SPECIAL WHEELS	SPECIAL TIRES	ELECTRIC LIGHTS	GENERATOR	OTHER EXTRAS	FREIGHT AND INSURANCE	WAR TAX	SALESMAN'S COMMISSION	TOTAL
											TOTAL COST OF SALES				
											GROSS PROFITS				

Form 1331

----- MOTOR TRUCK CO.

BRANCH

COMPARATIVE BALANCE SHEET

COMPARATIVE PROFIT & LOSS ACCOUNT

PERIOD ENDING

192

COMPARATIVE BALANCE SHEET				COMPARATIVE PROFIT & LOSS ACCOUNT									
ACCOUNTS		AS AT JANUARY 1st		AS AT THIS DATE		ACCOUNTS		FOR THE MONTH		ACCUMULATED TO DATE			
ASSETS		Detail	Totals	Detail	Totals			Amount	\$	THIS YEAR		PREVIOUS YEAR	
										Amount	\$	Amount	\$
PROPERTIES						SALES							
Land						Truck Sales							
Buildings						Parts Sales, etc.							
Machinery and Equipment						Used Truck Sales							
Factory Furniture and Shelving						Insurance Sales							
Tools						Total							
Office Furniture						COST OF SALES							
CURRENT ASSETS						Trucks							
New Trucks						Parts, etc.							
Used Trucks and Cars						Used Trucks							
Parts						Truck Insurance							
Work in Process						Total							
Garage Supplies						GROSS PROFIT							
Accounts Receivable (Control)						Selling and General Expenses							
----- Motor Trucks, Milwaukee						Advertising							
Notes Receivable						Office Salaries							
Liberty Bonds						Sales Manager Salary							
Cash in Bank						Salesmen Salaries and Comm.							
Petty Cash						Salesmen's Expenses							
DEFERRED CHARGES						Traveling (other than sales)							
Prepaid Insurance						Stationery and Printing							
Prepaid Advertising						Postage							
Total						Telegraph and Telephone							
Liabilities						Donations and Charity							
Capital Stock						Bad Debts							
CURRENT LIABILITIES						Legal							
Notes Payable						Depreciation							
Accounts Payable (Control)						Demonstrator Maintenance							
----- Motor Truck Co., Milwaukee—Parts						Fuel and Light							
" " " " " Trucks						Electricity							
" " " " " Miscellaneous						Garage Labor							
Unpaid Wages						Insurance							
Accrued Taxes						Rentals							
Customers' Deposits						Repairs and Renewals							
RESERVES						Taxes (other than income)							
For Bad Debts						Miscellaneous							
For Depreciation on Machinery						Office Expense							
" " " " " Factory Furniture						In Freight and Express							
" " " " " Office Furniture						Total							
SURPLUS						Profit from Operations							
						Special Charges and Credits							
						Federal Income Taxes							
						State Income Taxes							
						Interest Paid or Accrued							
						Interest Received							
Total						Total							
						Net Profit to Balance Sheet							

With Forms as These Accurately Filled Out the Dealer Will Always Know Whether He is Making or Losing Money

The upper form is for the purpose of recording all about the sales made during a certain month. From this form the total gross profits are readily determined. The lower form gives a record of the profits made during specific periods. By comparing these sheets from month to month one can quickly ascertain whether he is profiting or losing. Excessive expenses in any particular department can readily be detected and a check called upon them.

Some Reasons Why You Must

Analyze Your Territory and Your Sales

Every Truck Sold Should Earn a Profit for the Customer as Well as the Dealer

By R. E. CHAMBERLAIN, Assistant General Sales Manager Packard Motor Car Company

NONE of us would be willing to admit, I am sure, and certainly there can be no good ground for claiming that the retail truck business is fundamentally unsound. From all information I have been able to gather, and from all authorities I have talked to regarding it, I reached just one conclusion, and that is, that the average motor truck dealer, in particular, is less of a good business man than the average merchant. I grant you that in some ways his problems are more complex. Although he operates a store, he has practically no counter business other than repair parts. The amount of money invested in any one unit of merchandise is comparatively, tremendously large; every transaction involving the sale and delivery of that unit being much more complicated. Its character is such that he must service it and keep it in good mechanical condition. We readily admit that the troubles of the merchandiser of such a high-grade specialty, such as a motor truck, are very great—yet, when he endeavors to profit through the sale of that commodity, he takes to himself with the chance of profits, the risks also.

Two Kinds of Profits

The fundamental basis of the success in the retail truck business must be profits. These profits are of two distinct varieties. First, net profits to the dealer and tangible profits to the consumer, his customer. Let us work out briefly the chief fundamental underlying principles of a theoretical successful dealer in motor trucks. We must first establish him soundly financially, with an average brain, average business judgment, and enough money and financial resources to handle his business. These are points to which an appalling number of failures may be attributed; namely, the lack of understanding of the actual amount of money necessary to handle the business properly, together with a desire to get rich quick from the apparently large profits received from an average sale. Mr. Dunn and Mr. Bradstreet could tell you that one of the biggest reasons for all failures is the absence of application of

accurate bookkeeping and proper accounting methods. In a recent efficiency test of motor truck users which we held in Detroit, it was necessary to eliminate more than 40 per cent of the contestants because of the small inaccuracies and carelessness in bookkeeping, almost all of which has been presumably done by the bookkeepers of the companies involved. An active turnover of the stock of dealers is of vital importance, considering the inventories of used and new vehicles and parts, and it must be accomplished at a reasonable expense. Also adequate floor space and essential facilities at a reasonable cost, and I could for a long time go on pointing out various financial items to guard against and watch for, but in concluding that portion of our ideal dealer's business, suffice it to say, that without a well-balanced, soundly financed method, handled with good judgment, he would have no degree of success, no matter what his other policies might be.

The Need for a Market Analysis

We pass then to the merchandising of his goods. There are numerous matters which could be discussed here at great length, but it is my purpose to touch on only those which seem most important and tell you why we consider them so. First, and foremost, is Market Analysis. It is a study of the possibilities of the territory in which you propose to sell your merchandise. An average merchant gives a great deal of thought to the side of his business involving this matter because his location is most important to his success. The United Cigar Stores Company use great care in picking the locations or corners for their stores because their business depends largely on the vast number of people passing those particular points, and therefore, they investigate very carefully before leasing property for retail cigar stores. It is quite evident that it is equally important for every dealer to not only know that there is a market for his goods, but that this market has absorbed a certain quantity of each make, type and size. **Also it is important when the truck dealer makes up the factory contract with the manufac-**

turer to know whether or not there is a reasonable opportunity to sell a certain quantity of each sized vehicle. Surely it is desirable to know in laying out the plans on which we propose to conduct our business how many trucks of each size and type we ought to sell and where we ought to sell them.

Analysis Basis of Operations

So I suggest for this theoretical dealer a Market Analysis, which shall show the total number of trucks in the territory and divide them into their various sizes and types. We want them divided into the various manufacturers, and at a later date, we shall want again to sub-divide them into the various territories covered by our salesmen. We should know then just how many two-ton trucks, threes and fives, etc., we have a reasonable opportunity to dispose of in that territory because we know that it is reasonable to expect at least 20 per cent yearly replacement of those trucks already there, and at least 10 per cent increase in the total number of trucks operated during the coming year; together with a reasonable number sold to entirely new buyers. So in Market Analysis we give ourselves a basis of operations. We fix quotas. We find our weaknesses as well as our strength. I have an analysis that was recently made by a distributor of our company which shows that 52 3-10 per cent of the total trucks in a certain territory are of the 1½- and 2-ton size. My figures show also that out of the total trucks we have sold in this territory, only 38 5-10 per cent are 1½- and 2-ton trucks; consequently, someone of our competitors is beating us very badly and our job immediately becomes more concrete and definite by virtue of the information. It shows also that we are a little ahead of the other fellow in three-, four- and five-ton groups. So before we get very deeply into this job of distributing motor trucks in a given territory, let's find out what our job is. The only way to do that is by scientific MARKET ANALYSIS. The next step is to take these trucks that we have found and spot them in the territory so that we know where the groups

are and how many those groups consist of. For some years prior to last year we had been entirely unable to get a reasonable amount of business out of that portion of Chicago known as South Chicago. Three or four apparently good salesmen had been given the territory and continually starved to death, whereas Market Analysis showed definitely that the business was there. Therefore, we secured another man who had less exalted ideas about the amount of time he ought to work and of the character of the town in which he should work, and he made a little over \$17,000 in twelve months for himself in that previously barren section. I could tell you of a vast number of such instances where Market Analysis has, without question, proven the error of trying to run our business "catch as catch can" style.

When we have spotted these trucks on the map it is an easy matter to lay out reasonable territories for our men. It is not so easy to secure the right men and educate them in the right way.

Disabuse Prejudiced Salesmen

Some groups of our own salesmen seem to be loath to undertake any new theory, no matter how fundamental to their success it may seem from a logical standpoint, and they even resist doing so without knowing exactly why. A word here regarding salesmen's education may not be amiss. I believe thoroughly in a wealth of education for salesmen along practical lines. Many salesmen are quite incapable of handling a highly technical discussion and it is probably to be avoided where possible. Still, I feel sure that constant educational efforts are desirable and necessary if salesmen are to retain their enthusiastic attitude and prove themselves as thoroughly capable as the high quality of the business really demands. Many salesmen fail to appreciate the very high standard of the business they are involved in and if they would only consider themselves as sub-dealers in business for themselves, rather than as purely salaried or commissioned men of questionable responsibility, I think they would find thereby, great inspiration and it would serve more than any other one element to bring directly home to them the definite opportunities before them.

Must Consider Profits of the Customer

The two foregoing elements, that of sound financial basis and a sound merchandising basis, provide the safeguards for the profits of the dealer. From now on we must consider primarily the profits of our customer, because only on that consideration can we hope to properly merchandise a labor saving device in a sound way. We shall be far more certain of success if we base our sales on profits to our customers than on any other plan. Being reasonably sure of profits for our customer from the truck we sell him means far more than selling a truck to him. We were forced to dispense with the services of a salesman who sold over seventy-five trucks last year, and we let him go because he was not willing to consider the profits for his customer, but

insisted on selling him whatever he could get away with, rather than what the customer needed, which in our particular business we call **SELLING BY ANALYSIS**. It means that we want to know the work the truck is going to do in all its elements from the time the merchandise is ready to leave the door of the shipper, until it reaches its destination and is unloaded—we want to know the size of the package, and how it is packed—we want to know its weight and its character—the loading and unloading facilities—the distance it must go—the roads it must travel—the hills it encounters—the traffic it must share, and so on, and frequently after getting all these details, we find that Mr. Customer does not at all need what he thought he needed. Sometimes he needs more—sometimes less, and in rare occasions, nothing at all, or possibly already has too much. I don't believe it is bad business to tell a man who cannot use a truck that he had better save his money, although I have met men who thought that was the wildest kind of idealism. Still, our experience has been that the customer is so impressed with the honesty of purpose that he sells many a truck for you unbeknown. Many of our salesmen would love to spend their time hunting what they call "live ones," but the actual work-out of such a basis is not nearly as bad as it sounds. Take for instance a salesman who works in any particular section of Philadelphia. The majority of elements of any one of his prospects in that section would probably be very similar. They would only differ in the difficulties of merchandise to be carried; loading and unloading facilities and points at which the merchandise must be distributed. It is a relatively easy matter therefore to work out the matter of an individual analysis for any specific trade after the original one has been made. It gives you assurance that in selling a truck to your customer, you are not selling something he cannot use profitably. When he finds that such is the case, he reposes about the same amount of confidence in you that the man gets to whom you have told cannot use a truck at all, and although you may have sold but the one truck, you have two friends who are voluntary, gratuitous salesmen.

How the Plan Works Out

We have some very striking illustrations of great economic service from just this kind of work. One of our salesmen made a very brief analysis for the Albion Malleable Iron Company, at Albion, Michigan, the result of which was their laying a small stretch of special track—putting the truck on steel flange wheels, and by virtue of these installations and rearrangements, the company saves by the work of one truck alone, over \$4200 per year. Some cases are almost unbelievable—such as in Muskegon, Michigan, where a Foundry Sand Company, who by our Selling by Analysis method and through the installation of a fleet of trucks, saved upward to \$30,000 per year in the operation of their business. We have also many illustrations where our

own trucks have been very badly mis-sold, and there is deep regret over such occurrences. Still this proposition is fairly young and it is not easy to make all of our salesmen change their methods on the spur of the moment. So in our theoretical dealership, we are going to Sell by Analysis to be sure that our start with our customer is founded on honesty and confidence, which makes a staunch friend of him.

The Sales Manager's Qualifications

Let's pause a moment to consider two elements of gravest importance. First—Sales Management. Many competent men fail for lack of good leadership and many incompetent ones make progress by virtue of it. Management is all-important, but it must not be out of proportion with the volume of the business. Here are a few qualifications for a Sales Manager of a retail force.

First—Health.

Second—Leadership, ability, magnetism.

Third—Salesmanship—so that his salesmen may be sure of his ability and competence in directing them.

Fourth—Integrity—so that they may be sure of a square deal.

Fifth—Energy.

Sixth—Fair and still reasonably stern.

Seventh—Familiar, but not so familiar that he lacks standing.

Perhaps at the moment the most difficult question in the management of a business is the trade-in-feature. Particularly is this true in the present declining price period. The trade-in deal, the used car division, is, so to speak, the neck of the bottle and is largely the measure of a dealer's ability in new vehicles. Theoretically at least, a used car department should break even. If the department loses money, profits are reduced; if it makes money, profits are driven away by too low appraisal of the used vehicle. We have reached the following plan of appraisal of used vehicles. First a price is set which we feel it will bring in any certain condition. From this is deducted first the cost of putting it in that condition, and second, from 17 to 20 per cent representing its selling cost. The difference then represents its appraisal price. The holes in it are buying the vehicle at the proper price—putting it quickly in shape to sell, because much money is lost in carrying charges alone, and third, having an organization capable of selling it once it is ready for the market.

Retaining the Customers' Confidence

Now if we are to retain the confidence we have secured of our customers, if we are to follow through and become real, we must see that our Service Department is up to grade in every way. A large part of the faults of our Service Department rest solely on our own shoulders—the majority of the complaints of service are solely our own fault for not, in the first place, having properly sold the service offered. It is very easy to give customers an idea of great expectations without having said very much, and the customer who lacks a little of our previously discussed

confidence, constantly demands the extreme in his desire to satisfy himself that he is going to get fair treatment. Service is efficient attention at a reasonable cost, so far as the repairs to the vehicle itself are concerned, but there are other elements in service that must be considered if we hope to succeed in a reasonable way.

First, our stock of repair parts must be adequate, but not unbalanced. Second, we must make good on our promises of free service, such as inspection of trucks, instruction of drivers, promises of completed work. This instruction of drivers is a very important element, and in our organization we consider it a great sales help. In a majority of our distributor's places now we are operating Truck Drivers' Schools, the success of which is remarkable in many ways. Of course some of our people go to extremes, and some follow the fairly middle road. The year before last we had an attendance at our St. Louis School of over twelve hundred drivers—obviously, this is extreme and perhaps much of the actual good was lost that could have been done with smaller

sized classes. There is the other extreme also, which is not broad enough, but let us recommend to the theoretical dealer at least that attention be given to the ignorance of the driver of the truck he sold, and, **thereby, aid his customer in getting the service he is entitled to from the vehicle he sells.**

We have established a dealer theoretically sound in finance, who knows his problems and his job, with a competent organization, properly directed, based on sound merchandising, backed up by good service. Many are the pitfalls of such a business man, but his chance is good. His banker will consider him a good risk and the motor truck business in general will get on to a firm foundation and in that respect be comparative with other businesses just as soon as a majority of our local distributors put themselves in comparatively such a situation.

There is one thing of greatest importance that I have tried to drive home to all of our organization. We never look for cleverness—we are never impressed with the man who can devise a most re-

markable scheme for securing a large volume of business. We are more interested in the steadier sort of a chap—the fellow who knows less of cleverness, but **MORE of WORK.** I used to have an associate at Detroit who was a wonderful originator—he could start more things and find more things to do than any man I ever saw, but the doing of them was a practical impossibility, and his value sagged accordingly. Let's have a plain sales plan for the business, such as that we have outlined, based on honesty and confidence, confidence gained because our fundamental elements are correct, and because they are handled by competent men. Let's have one other thing—that great antidote for all ills—**WORK.** Our theoretical dealer can no more succeed without this than he can continually borrow money without good credit. He and his men must have it in good measure, give of it in large portions and constantly. It will produce happiness and success any place in the land, in any line of business, in any walk of life, provided, the other few fundamental elements are right.

Our London Letter

By OUR SPECIAL CORRESPONDENT

THE railway strike drags on, consequently there is little to chronicle, for with the continuance of the dispute unsettled and stagnant business conditions continue in other lines of endeavor. There is now much unemployment and many works have shut down temporarily, awaiting the day when the strike is lifted and business revives.

The Coal Strike Favors the Road

Nevertheless, the effect of the coal strike on road motor transport is interesting. Owing to the cut-down train service there has been a boom in passenger vehicles. For the Whitsuntide holidays the railroads usually issue cheap excursion fares, and as a result run an enormously "increased train service, but this Whitsun only an attenuated service was available. Therefore, the public took to the roads in hundreds of thousands. On Bank Holiday in a single day the London General Omnibus Co. carried 500,000 people and one car alone took nearly \$300 for the day's work—and remember that traveling in England is cheaper than in America.

To Race Meetings by Automobile

Under Government restrictions race meetings have only been held on the understanding that no extra trains should be run. Under these conditions, take a place like Newmarket, some 50 miles from London and on a little branch railroad and imagine the result. But, despite the fact that during the recent races the train service could only have carried four or five hundred people at the outside, thousands attended from all over the country

and the big observation cars alone numbered hundreds.

Then, too, there are difficulties in getting the horses to the course, and so there is a demand for automobile horse vans.

All this is serving as such an advertisement for road traffic as nothing else could: it is making the public realize the pleasures of the road, and thousands will be leath to go back to the stuffy railroad car, which, divided into little compartments, is a very different proposition from the American rail car.

Present Taxation Unfavorable

The only other event of general note has been the deputation to the Ministry of Transport to ask that the present system of taxation (by horse-power for private cars, passenger seating accommodation and unladen weight for business vehicles) should be substituted by taxation of fuel used. The latter was the system in force until the beginning of this year. It was pointed out that gasoline prices were much higher than they should be, and the consumer was not getting the benefit of the abolition of the old gasoline duties. It was mentioned that while the price of crude had fallen 50 per cent since the middle of last year, that of gasoline had increased 10 per cent, although it was admitted that the cost of crude regulated that of gasoline. Reading between the lines it looked as if this case had made some impression on the Minister of Transport, who, however, held that experience with the present duties was as yet insufficient for the formation of any hard and fast conclusions. Therefore, though we are not likely to immediately

go back to taxation by fuel, such a change would not be surprising in the long run. Neither would a drop in the price of gasoline, for present high prices have restricted demand.

New French Road Traffic Regulations

The new Code de la Route, or Rule of the Road, which has recently been submitted for the signature of the French President contains some drastic changes, the most noticeable of which is the abolition of speed limits for vehicles weighing less than three tons loaded. The drivers of these, however, must always have their speed under control, and the new regulations confirm their present responsibilities for any accidents owing to carelessness or rashness. Speed limits on vehicles of over three tons are imposed with a view to preservation of the roadway rather than in the interests of pedestrians and other road users. And with the same object all vehicles are required to have tires varying in width with their weight. Single trailers are allowed subject to certain easily fulfilled conditions. Glaring headlights are prohibited in all places where public lighting is provided, and when used, the rays must not rise more than 39 in. above ground level.

Certain still more radical changes which had been advocated are conspicuous by their absence. It was suggested that the old rule "keep to the right and pass to the left" should be altered, but after long deliberation it has been retained, owing to the great disturbance that any such change would cause for a long time. At cross-roads a driver must give way to any vehicle approaching on his right

Why is This Concern a Success?

Recognition of Four Fundamental Selling Points



Fort Street Branch of the Carney, Labadie & Co., Detroit. Truck Tires Only Are Handled Here

Studied Tire Service Application to the nth Degree

By A. V. COMINGS

THAT there is real money in selling truck tires, if the business is conducted in a businesslike manner, has been abundantly proved by Carney, Labadie & Co., of Detroit. For ten years this company has sold Firestone truck tires and has proved at least four fundamental points that are of particular interest to the tire trade just at this time. They are:

First: That the tire business is no different from any other line of business and success may be attained by observing the same rules that have brought success in other lines.

Second: That concentrating on one line of tires and devoting all their business energy to merchandising this one line, spells success in tires, as in other work.

Third: That it is not necessary to cut prices to succeed in the tire business.

Fourth: That absolutely first-class service is necessary to success in selling truck tires, but that this service must be sold at a fair profit and not given away.

Has this company been successful? Well, the company started ten years ago in a little twenty-by-fifty room, consider-

ably off the main business streets in Detroit, and today it has three big branches, each one so located that it serves its particular class of work to the very best advantage.

The truck tire branch is located in the heart of the wholesale district, where the most motor trucks are to be found, and A. I. Carney, one of the members of the company, is in charge of this department.

Not only is there an attractive office and salesroom at this store, but a complete service station is maintained and a wood-working plant, in which any repairs may be made on truck wheels at the same time that tire changes are being made. This wood-working plant has proved a big business builder, for it enables the truck owner to cut down the idle time of his truck materially, through having wheel-work done at the same time that tire work is in progress. This is merely a part of the service that the company maintains, and which not only builds business, but brings in a distinct revenue that adds to the success of the business.

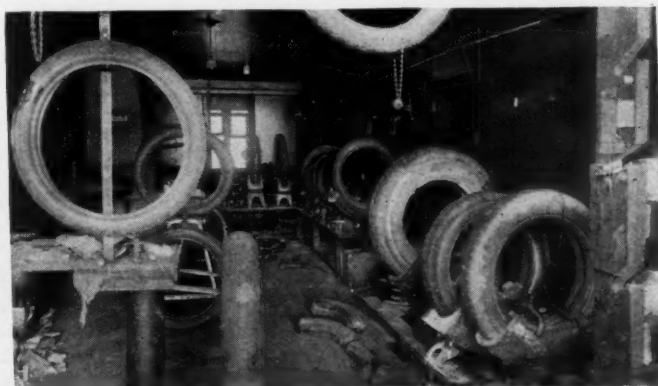
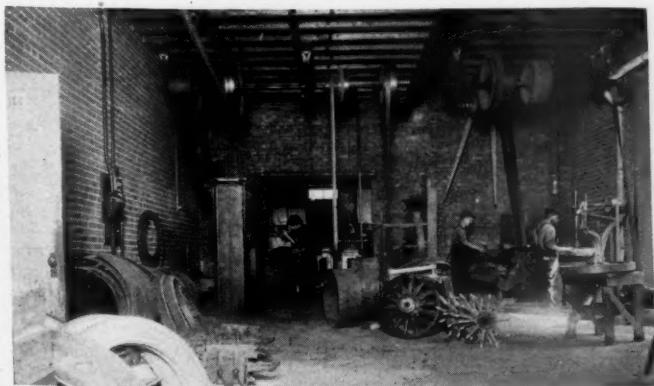
Free service is not tolerated around the Carney, Labadie stores. This com-

pany feels that an organization selling truck tires is in duty bound to be prepared to render any service the truck owner wants; that it must maintain shops and equipment to render this service, and that in return the truck owner should be willing to pay for this service. To date this plan has been a business builder rather than a hindrance. Says C. F. Carney:

"We have found that the legitimate truck owner, the man who is in the business in a businesslike way, wants the very best of service, and that he understands that it costs us money to be prepared to furnish him that service. And, consequently, he is entirely willing to pay us a price for it that will assure us a fair profit on service work, just the same as on the sale of new tires."

In addition to its complete stock of tires of all sizes and types maintained in this branch, the company keeps a complete stock of Firestone rims for all makes of trucks, and this has also proved a valuable asset in making tire sales.

There is no guesswork or random sales efforts in the Carney, Labadie method of selling truck tires. A complete list of the truck users in Wayne county is kept at all times, and salesmen are on the go every day calling on these truck owners.



Two Views of the Interior of the Fort Street Branch. Service is the Underlying Reason for the Existence of This Equipment. Wheel Work Service Has Done Much to Boost the Sales of This Company

Fleet owners are given particular attention, and to them especially the complete service equipment of the company appeals as a real asset.

A record is kept of tires sold, so that salesmen may again call when these tires are about ready for replacement, this method saving the time of the salesman who might be calling on truck owners otherwise who were not in the market.

Form letters are used in going after business and in keeping the firm name before truck owners, and, in addition, a blotting pad is sent out to business houses using trucks, the pad having a white celluloid cover, showing pictures of the company's stores and various service departments. This method drives home to the prospect the excellent service facilities of the company.

The methods of the Carney, Labadie concern may well be studied by other truck tire selling organizations, as these methods have brought success through their excellence and should bring success wherever intelligently used.



Overhead Trolley and Crane is Used in Conjunction With This Huge Tire Press

Concrete Roads Lower Hauling Costs for Grain and Feed

HAULING costs for grain and feed distributed by the Golden Eagle Milling Co., Petaluma, Calif., reflect clearly the condition of the highways, says H. H. Kalish, Superintendent of Transportation, Golden Eagle Milling Co. His company delivers approximately 100 tons of grain and other feeds per day within a radius of twenty-six miles from its warehouse at Petaluma. The territory served is one of the greatest poultry producing sections in the world and consumes immense quantities of small grains, practically none of which are raised in the vicinity.

The milling company owns and operates five motor trucks and six teams to make its deliveries in the district. Motor trucks are used for shipments to points along the paved highways and the teams are used for deliveries over unimproved roads. Hauls of less than four miles are also usually made by the teams.

The size of the load that can be hauled and the speed at which the trip can be made depends altogether upon the condition of the connecting roads. Over the concrete paved state highways the trucks can be safely loaded to supply more than their rated capacity and a speed of twenty-five miles an hour is found perfectly feasible and safe. Over unimproved roads a speed limit of ten miles an hour is maintained and the load capacity of trucks is greatly reduced.

A comparison of two typical deliveries from the Petaluma warehouse illustrates the importance of paved highways to this business. They can deliver a 3-ton load to points in Santa Rosa, sixteen miles from the warehouse, with concrete pavements all the way, in a little over three hours for the round trip, by the truck. In another direction it is necessary to make frequent deliveries to Tomales, which is also just sixteen miles from the

warehouse, but connecting roads are unimproved. The load for the same motor truck must be reduced one-sixth and the round trip requires about five hours; thus almost doubling the cost of delivery over roads to Santa Rosa. On the shorter hauls the difference in time consumed, of course, is not so great because the idle time for loading and unloading constitutes a larger proportion of the total time for which the vehicle must be tied up with a certain delivery.

Besides the lost time and reduced load capacity, when trips must be made over unimproved highways, the depreciation of the truck itself and the tires and the amount of fuel required is a very important factor in our delivery costs. Truck operating charges must be uniform to all customers and are computed to cover all of the types of road in the vicinity. The hauling charges must also absorb the idle time of the vehicle while loading and unloading. Therefore, a graduated scale has been calculated which takes these factors into account: for example, for a delivery $1\frac{1}{2}$ miles from the warehouse, the charge is 75 cents per ton, which is at the rate of 50 cents per ton mile. For a delivery 6 miles from the warehouse, the charge is \$1.80 per ton, or 30 cents per ton mile and for a 20-mile trip, the charge is \$4.10 per ton, or 20 cents per ton mile. It is difficult this company says, to segregate costs to show exactly the difference in operating charges by the various types of road, but they are positive that a comprehensive system of paved highways serving all of the company's trading territory would greatly reduce the fixed charge per day for the trucks and that hauling rates could be cut accordingly.

A New Enemy of the Tire Discovered

A new menace to motorists called the Devil's Bur, a vine with spiny seeds which will attach themselves to tires and cause punctures is receiving the attention of the U. S. Department of Agriculture. The puncture vine, known scientifically as the *Tribulus terrestris*, although a native of southern Europe, is now spreading through California, Arizona, Indiana, Iowa, Illinois, Nebraska, Kansas, Arkansas and Texas. Hope for its eradication in fields is given in the fact that it is an annual and can be controlled by repeated cultivation, thereby preventing the formation of seed.



Roads Such as These Facilitate Loading and Delivery and Result in a Big Saving in Time and Money

Tractor and Truck Take Place of Fifty Mules



Best Tractor Pulling Combine With Hopper Wagon Receiving Wheat. Truck Loading in Background

Clever Handling of Haulage Problem Saves Thousands of Dollars for Oregon Ranchman Through Use of Tractor and Truck With Grain Elevator Attachment

Special Wagons Help to Handle Grain. Combine Threshers Used. Saves Month of Mule Haulage When Grain is Threshed. Details of a Real Motorized Farm System

By A. V. COMINGS

STUDENTS of motor transportation agree that if the proper amount of thought and study is given to devising economical methods of using motor trucks, truck sales will be given a great stimulus. The present day method of selling a motor truck is usually to sell the prospect the biggest truck he can pay for and then turn him loose with it, to make money or go broke, according to his own ingenuity in devising ways to cut haulage costs. And the usual truck driver hasn't the right type of brain to devise cost-cutting methods.

Personally, I believe that a motor truck dealer owes it to his customer to aid him in every way in pointing out, from his wider experience, how the customer can cut his haulage costs in every possible

way, that the customer may make money on his truck and therefore be satisfied and become a prospect for further purchases of the same make.

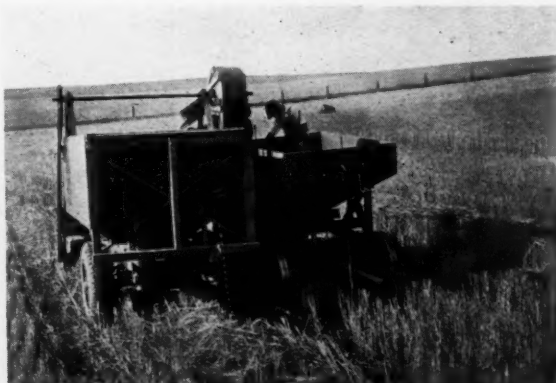
While on a western trip last summer I heard of a very ingenious method of handling wheat on a large ranch which cut haulage costs to a minimum, saved the rancher thousands of dollars and got his wheat into the elevators thirty days earlier than usual. Although this method cannot be used on every farm, there are hundreds of large farms in the wheat country where it can be used with great economy, and an adaptation of it may also be used on smaller farms in the diversified farming country.

This outfit was used on a great wheat ranch near Pendleton, Oregon, consisting

of two sections with a railroad running between and an elevator located on the railroad equally accessible from both sections.

In the big western wheat fields the ordinary type of thresher as known in the East is not used. In its place is used what is known as a "combine," a machine that cuts, threshes and sacks the grain as it moves along, drawn either by twenty or thirty mules or a powerful tractor. In this case the combine was drawn by a Best tractor of 60 hp. of the tracklayer type. The combine cut a twenty-foot swath and the threshed grain was conveyed into the combine bulk grain attachment.

The usual method from here is to run the grain into sacks, which are dropped



Front and Rear Views of a Republic Truck With Grain Hoist on Side Loading Grain From Hopper Wagon Dropped by Combine



The Grain Hoist on the Truck Driven by Sprocket From Power Take-off on Truck Transmission

Note hopper body on truck to facilitate unloading into pit

to the ground to be gathered up later by mule teams drawing huge wagons.

In this instance, however, five specially built hopper wagons of 60 bushel capacity each were used, placed at equidistant spots around the field, one always being fastened to the combine and moving with it, and receiving the threshed grain as it poured from the spout.

When this wagon was filled it was disconnected from the combine and another, which would be at hand, fastened in its place.

Then up would drive a Model 19 Republic truck, on which was a 90 bushel hopper grain body and a special grain hoisting attachment. This attachment consisted of an elevator attached to the side of the body and driven by a chain belt from a gear in turn driven from a power take off on the truck transmission. The elevator was so hung that it could be lowered to the level of the spout on the wagon, the spout on the elevator was then connected, the wagon gate opened and with the elevator being driven by the truck engine it took about two minutes to transfer the grain to the truck body.

An Indispensable Link; the Truck

With the wagon empty it was hauled into the next furrow to be ready for the combine when it came around again. The truck moved on to the next full wagon, repeated the operation and then hit the ball for the elevator located on the railroad. Here the truck with its load was first weighed, then the load was dumped into the pit beneath the scales through its hopper bottom and then the truck was weighed empty. From the pits the grain was elevated to the various parts of the elevator in the usual way.

Last year about 700 acres were planted to wheat on this ranch. Eight hours a day were spent in cutting and an average of 45 acres a day were cut, threshed and hauled to the elevator. The truck hauled an average of over 85 bushels to

the load and made about thirty trips a day.

One of the greatest advantages of this method of handling the threshed wheat is that when the threshing is through the hauling is through also. Previously, when the cutting was done the field would be dotted with thousands of sacks of threshed grain and for a month or more the six and eight mule teams with their sweating drivers would be busy hauling the grain to the elevator.

New Method a Big Saving

By the new method the last grain is on the way to the elevator a few minutes after it is cut and threshed by the combine and the big expense of the fifty or sixty mules, with their men and feed for a month, is done away with.

The motor truck demonstrated, too, that it could go day in and day out over stubble field with a capacity load on its pneumatic tires, over the light, shifting volcanic ash soil which makes this great wheat country what it is. And any one who knows this type of soil will agree that this is some test for a truck.

Six men handled this motorized equipment, including the tractor and combine, and before the days of the tractor and truck it took fifty to sixty mules, with all their attendants. The truck was able to keep the combine clear of grain at all times, there being no delay from the truck at any time.

This place is a fine example of a thoroughly motorized ranch. It has long been considered a model in equipment for the wheat growers of the Oregon country. Two mules on the "roustabout" wagon were the only remains of the former equine equipment, all the rest of the equipment being motorized.

Make the Truck a Farm Necessity

It is my belief that motor truck dealers in farm communities in the East could adapt something of this type of labor-saving machinery to their own section's harvest problems and thereby sell many more trucks than they do. It is worth careful study, to say the least. Show the farmer where he can practice economies such as this and he will be a ready prospect for the truck.

Commercial Car Journal is indebted for the data and pictures in this article to H. W. Roberts, general manager of the Roberts Motor Car Co., of Portland, Ore., distributors for Republic trucks in Oregon and Idaho. The Roberts Company is one of the liveliest motor truck distributing organizations in the West and have lent their aid to this project from the first. The country needs more dealers like them.



Five-Ton Federal Truck Performs Task in One Day Formerly Done by Twenty-Eight Mules in Three Days

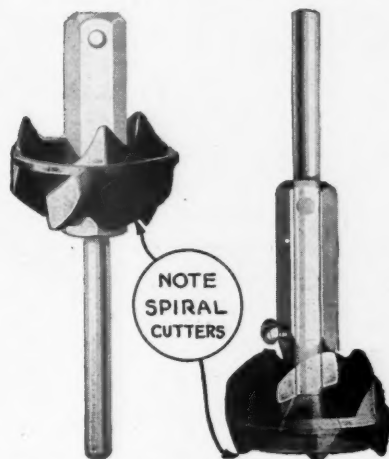
Ten years ago it took 28 mules three days to transport one of these immense boilers 5000 feet up in the Sierras to the Madera Sugar Pine Mills, sixty miles from Madera, California, the nearest railroad point. Recently a 5 ton Federal performed the same task in one day. The roads are full of dangerous winding turns, often attaining a grade of 20 per cent, and several times it was necessary to chop down a fairsized tree and drag it behind the truck as an additional brake.

Service Station and Repair Shop Appliances

Thomason Piston Aligning Fixture

The substantial construction of the Thomason Piston aligning and bearing fitting fixture, offered by the Shepard-Thomason Co., Los Angeles, Cal., is said to make it especially adaptable for aligning pistons and fitting bearings.

The aligning plate with supporting arm (consult accompanying illustration) can be swung to one side or removed entire-



New Tool Combined Valve Reseater and Refacer

This combination valve seating and refacing cutter comes complete with a feed spring, and handle. The pilot is 5-16-in. diam. and removable. The list price is \$3.50 complete.

Jumbo De Luxe Air Compressor

The latest addition to the Usaco line of the United States Air Compressor Co., Cleveland, Ohio, is the Jumbo De Luxe air compressor. It is fully automatic throughout and is especially designed for large garages and repair shops where a considerable volume of air is required for intermittent service in cleaning and general repair work.

The Jumbo is also said to have facilities for quickly inflating the largest of giant cord pneumatics. It has the pressure unloader and oil trap features. Lubrication is provided by the splash system and a sight feed oiler is provided.

A fan flywheel in conjunction with cylinder fins and intercooler is claimed to keep this compressor cool under the most severe conditions.

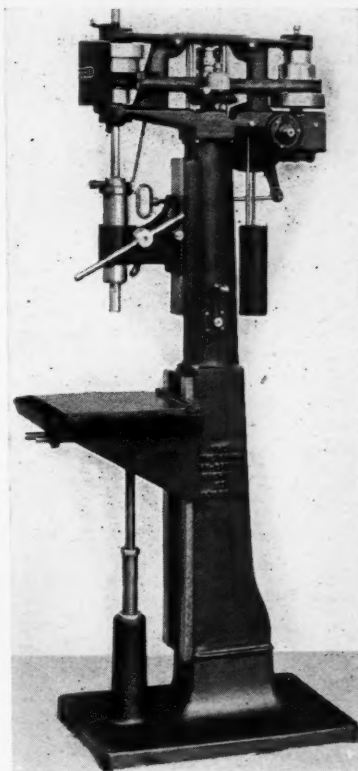


The Jumbo De Luxe Air Compressor

Cincinnati Hy-Speed Drilling Machine

A complete line of Hy-Speed drilling, tapping and automatic drilling and tapping machines has been developed by the Cincinnati Hy-Speed Machine Co., Cincinnati, O.

Among the new features seen on the Hy-Speed drilling machines are the following: single pulley direct overhead drive, dry plate clutch operating in con-



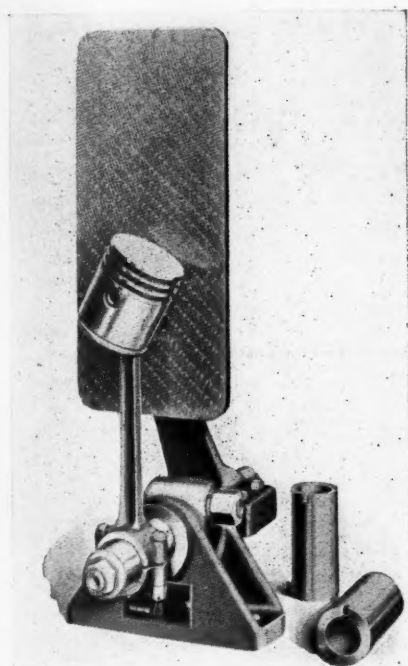
New Development of the Cincinnati Machine Co.

Many new features are incorporated in this new drilling machine

nection with external clamping adjustable air cooled brake. By a single handle directly in front of operator, machine may be started and stopped instantly, adding considerable speed and convenience to the operation of these machines. Elevating mechanism to table is so arranged to allow taps, etc., to pass through center of table. This idea combined with the use of quick release chuck allows tapping without reverse at high spindle speeds. Spindle speeds are controlled by handle on side of column. Automatic power feed and automatic tapping attachment can be arranged on any spindle.

Complete unit construction is embodied in these machines. Entire clutch brake and initial driving gear is separate unit that is set into top bracket of machine. For accessibility counter weight for spindle is hung on outside of machine.

The narrow face idler pulley is carried



Thomason Piston Aligning Fixture
Showing manner in which the piston is mounted on fixture

ly. With the fixture a sleeve 4 in. long is used, it having a keyway engaging with a key in the base, which keeps it from turning when used as a bearing fitting fixture.

The standard arbor, when sleeves are used, is 1 3/4 in. It can also be supplied with solid, hardened and ground arbors of various sizes.

Combination Valve Seating and Refacing Cutter

A tool that can be utilized for either refacing valves or reseating valve seats of any valve having a 5-16-in. stem is the latest product of the Eclipse Accessories Mfg. Co., Cleveland, Ohio.

The cutter is made of drop-forged, heat-treated and hardened tool steel. The flutes are forged on both sides of the cutter at the same time and are all set spiral and spaced convex and concave. The seating part of the cutter has five flutes and the valve side three flutes, which, because of their spiral setting, are stated to eliminate chatter while in use.

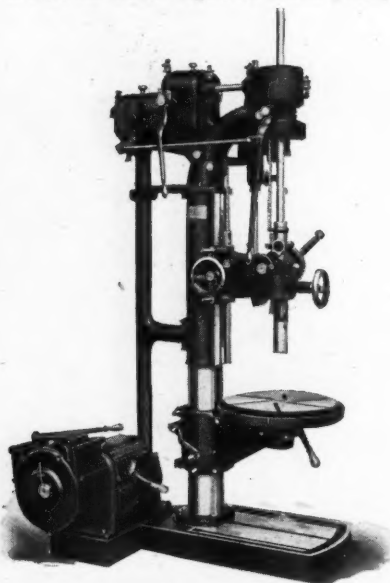
direct on belt shifters and moving intermittently with the shifters helps lead cone belt from one step to another.

Aluminum pulleys are employed throughout. Pump and tank is separate unit, attached to base of machine and arranged for ease of cleaning.

Machines are built in the following types: Floor and bench, single speed purpose, belted motor drive, automatic power feed and automatic tapper. All machines are equipped with S. K. F. ball bearings.

Fosdick Heavy-Duty Drill

A new addition to the line of the Fosdick Machine Tool Co., Cincinnati, O., is a new 21-in. heavy-duty drilling and tapping machine. With it, the maker states, a 2½-in. high-speed drill can be driven through steel and a 3-in. tap in cast iron. The drill is ordinarily driven by a belt to either tight or loose pulleys.



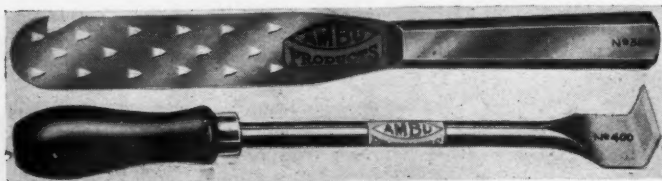
Fosdick Twenty-One Inch Upright Drill
It has a wide range of speed and improved tapping attachment

A wide range of speed arranged in geometrical progression from 49 to 550 r.p.m. is provided. It is suitable for driving all size drills from 3-16 in. diam. up to 5-in.

Each machine is equipped with an improved tapping attachment controlled by a lever alongside the spindle head, which instantly starts, stops or reverses spindle.

New Ambu Battery Tools

One of the new tools now being put on the market by the American Bureau of Engineering, Inc., Chicago, Ill., is known as the Ambu Separator Remover. Its construction is simple and usefulness valuable.



Two New Battery Repair Tools Introduced by the American Bureau of Engineering, Inc.

Any one who has ever had the job of tearing apart a battery, knows how useful a tool of the type illustrated will be to slip in between the plates and the separator, with the teeth side of the blade next to the separator. A pull brings out the separator with the blade. Sells for 75c.

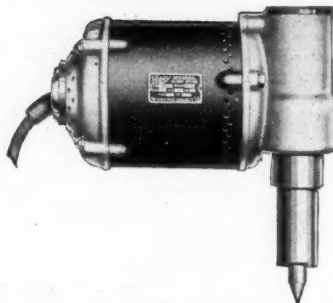
Another handy tool now being offered the battery repair man by the company is known as the Ambu Battery Box Scraper.

This tool will be found very useful in removing the compound in battery boxes, as well as other ways in the battery shop.

The price is 50c.

Hisey Offers Electric Screw-Drivers

The Hisey-Wolf Machine Co., Cincinnati, O., comes to the fore again with its recently announced electric screw-driver. It is designed with an improved driving head, thereby giving the operator full control at all times. This feature of com-



Recently Announced Hisey-Wolf Electric Screw-Driver

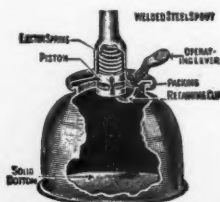
plete control, together with the feature of a firmly mounted and truly running spindle, permits the driving of screws by a new and more efficient method.

The accompanying illustration shows a type 3 QUA close quarter screw-driver with an off-center spindle. Another model is the type 3 QSU end handle screw-driver with an off-center spindle.

Force-Feed Oil Can

Gustave Lidseen, 832 Central Ave., Chicago, Ill., introduces a new oil can known as Lidseen Positive Force Feed Oiler. This oil can, which is made in different sizes and in various finishes, provides force feed and controls the oil that a drop or a small quantity can be fed at a time.

The accompanying illustration shows the large opening for filling and also the curved flanges and locking members which make it easy to fill. The spouts are welded and cannot be broken open. It is made of heavy drawn steel. The operating lever is shown on the lid.



Lidseen Force-Feed Oil Can

Robertson Tire Inspector

A stand that greatly facilitates the inspection of tires is the recently announced product of the Rockford Tire & Vulcanizing Co., Rockford, Ill. The illustration shown herewith, shows the ease with which a tire repairman can inspect and scrutinize thoroughly every square inch of tire surface.

The tire is moved around on rollers by hand, and a foot lever which operates two pulling fingers, one on each end of the tire, spreads open the beads and gives a clear and unobstructed view to the entire inner side of the tire.

This stand may also be used very satisfactorily, to time and labor saving benefit, for inserting tubes in casings, in making repairs and inserting reliners.



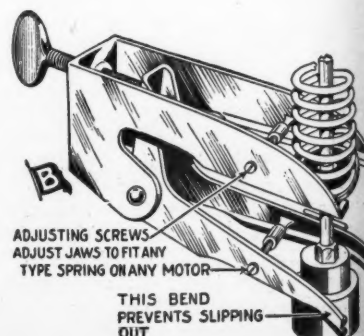
Quick Method of Inspecting Tires for Flaws

Sunnen Valve Lifter

Operation of the Sunnen Universal valve lifter made by the Sunnen Products Co., St. Louis, Mo., is simple and effective. By studying the accompanying illustration the principle of construction and the method of use can be readily understood.

The upper jaws of this valve lifter can be adjusted to fit any valve spring seat and the lower jaws to rest on any push rod. The lifter can be swung around in any position without slipping out.

This tool is strongly constructed and is made of cold rolled steel. The price is \$2.



Sunnen Universal Valve Lifter

Replacement Table—Corrected Monthly

Including Piston Ring Sizes, Carburetor Sizes, Hose Sizes, Fan Belt Sizes, Brake Lining Sizes and Truck Frame Dimensions

Note: Under Carburetor Inlet Diameter Will be Found Either the Size of Main Air Intake or the Gasoline Fuel Line

Fan Belt Type: V—V-Shape, F—Flat, R—Round

Name, Model and Tonnage	ENGINE										BRAKE LINING							FRAME				
	Piston Rings		Carburetor			Upper Hose		Lower Hose		Fan Belt			Service				Emergency			Length	Width	
	No. per Cyl.	Width	Outlet Diameter	Inlet Diameter	Vertical or Horizontal	Length	Width	Length	Width	Length	Width	Type	Length	Width	Thickness	No. of Pieces	Length	Width	Thickness	No. of Pieces	Back of Driver's Seat	Over All
Acason R-1—1920.....	4	1 1/4	1										11 1/2	3	1/4	2	11 1/2	3	1/4	2	112	34
Acason RB-1 1/2—1920.....	4	1 1/4	1										11 1/2	3	1/4	2	11 1/2	3	1/4	2	112	34
Acason H-2 1/2—1920.....	3	1 1/4	1										13 1/2	3	1/4	2	13 1/2	3	1/4	2	130	35
Acason L-3 1/2—1920.....	3	1 1/4	1										16	3	1/4	2	16	3	1/4	2	163 1/2	35
Acason M-5—1920.....	3	1 1/4	1										18	4	1/4	2	18	4	1/4	2	167 1/2	35
Ac, Series A 1 1/2—1920.....	4	1 1/4	1 1/4	V	10 3/4	2 1/4	6 1/4	2	1 1/4	37 1/2	1	F	12	3 1/4	1/4	4	12	3 1/4	1/4	4	122 1/2	32
Ac, Series A 2 1/2—1919-20.....	4	1 1/4	1 1/4	V	10 3/4	2 1/4	6 1/4	2	1 1/4	33	1 1/4	F	13	3 1/4	1/4	4	13	3 1/4	1/4	4	144 1/2	32
Acme G-1/2.....	3	1 1/4	1	V	11	2	11	2	1	38 3/4		V	12	2 3/4	1/4	4	12	2 3/4	1/4	4	110 3/4	34
Acme B-1—1916-20.....	3	1 1/4	1	V	11	2	11	2	1	38 3/4		V	12	2 3/4	1/4	4	12	2 3/4	1/4	4	110 3/4	34
Acme F-1 1/2—1919-20.....	3	1 1/4	1	H	8	1 1/2	11 1/2	1 1/2	1	40	1 1/4	V	12	3 1/4	1/4	4	12	3 1/4	1/4	4	122	34
Acme A-2—1916-20.....	3	1 1/4	1 1/4	H	7	1 1/4	11	1 1/4	1	33 3/4		V	13	3 1/4	1/4	4	13	3 1/4	1/4	4	135 1/2	34
Acme C-3 1/2—1917-20.....	3	1 1/4	1 1/4	H	12	1 3/4	8	1 1/4	1	33 1/2	1 1/4	F	15 1/2	3 3/4	1/4	4	15 1/2	3 3/4	1/4	4	150 3/4	36
Acme E-5—1919-20.....	3	1 1/4	1 1/4	H	11	2	14	2	1	40 1/2	2	F	18	4	1/4	4	18	4	1/4	4	160 3/4	37
American 25-2 1/2.....	4	1 1/4	1 1/4	V	19	1 3/4	9 1/2	1 3/4	1	38	2	F	57	2 1/2	1/4	2	41 1/2	2 1/2	1/4	2	142	33
American 40-4.....	4	1 1/4	1 1/4	V	19	1 3/4	9 1/2	1 3/4	1	38	2	F	57	2 1/2	1/4	2	41 1/2	2 1/2	1/4	2	142	33
American 50-5.....	4	1 1/4	1 1/4	V	19	1 3/4	9 1/2	1 3/4	1	38	2	F	57	2 1/2	1/4	2	41 1/2	2 1/2	1/4	2	142	33
Apex C-1.....	3	1 1/4	1	V	7 1/4	2	12	2	1	36 1/2	1/8		42	2	1/4	2	41 1/2	2	1/4	2	102	35 1/2
Apex D-1 1/2.....	3	1 1/4	1	V	7 1/4	2	12	2	1	36 1/2	1/8		42	2	1/4	2	41 1/2	2	1/4	2	102	35 1/2
Apex E-2 1/2.....	4	1 1/4	1	V	7 1/4	2	12	2	1	32	1	F	54	2 1/4	1/4	2	53 1/4	2 1/4	1/4	2	128	31 1/2
Armleder 20.....	4	1 1/4	1	V	13	1 1/4	16 1/2	1 1/4	1	31 3/4	2	F	11 1/2	3 1/4	1/4	4	11 1/2	3 1/4	1/4	4	104 1/4	32
Armleder KW-3 1/2—1916-20.....	4	1 1/4	1 1/4	V	12 1/4	2	16 1/2	1 1/4	1	36	2	F	42	3	1/4	4	41 1/4	3	1/4	4	150	36
Armleder HW-2 1/2—1916-20.....	4	1 1/4	1 1/4	V	10	1 1/2	11 1/2	1 1/2	1	34	2	F	13 1/4	3 1/4	1/4	4	13 1/4	3 1/4	1/4	4	140	32
Atco B-1 1/2.....	4	1 1/4	1	V	11	2	11	1 1/4	1	31 1/2	2	F	25 1/2	2 1/2	1/4	4	18	2 1/2	1/4	4	109 3/4	32
Atco B1-1 1/2.....	4	1 1/4	1	V	11	2	11	1 1/4	1	31 1/2	2	F	25 1/2	2 1/2	1/4	4	18	2 1/2	1/4	4	109 3/4	32
Atco A-2 1/2.....	4	1 1/4	1 1/4	V	12	2	11	1 1/4	1	33 1/4	1 1/4	F	46	2 1/2	1/4	4	46	2 1/2	1/4	4	124 1/4	33
Atlas 21-1.....	4	1 1/4	1 1/4	H	9	2 1/4	14 1/2	2 1/4	1	31 1/2	1	F	40	2 1/4	1	4	22 1/2	2 1/4	1	4	84 3/4	33 1/2
Atterbury 20R-1 1/2—1920.....	3	1 1/4	1 1/4		8	1 1/4	14 1/2	1 1/4	1	38 1/4	1 1/4	F	11 1/4	3 1/4	1/4	4	11 1/4	3 1/4	1/4	4	122 1/4	34
Atterbury 7CX-2 1/2—1919-20.....	3	1 1/4	1 1/4		5 3/4	1 1/4	6 3/4	1 1/4	1	30 1/4	1 1/4	F	13 1/4	3 1/4	1/4	4	13 1/4	3 1/4	1/4	4	133 3/4	34
Atterbury 7D-3 1/2—1917-20.....	3	1 1/4	1 1/4		8	1 1/2	6	1 1/2	1	30 1/4	1 1/4	F	15 1/4	3 1/4	1/4	4	15 1/4	3 1/4	1/4	4	145 1/4	37 1/2
Atterbury 8F-5—1919-20.....	3	1 1/4	1 1/4		14	2	20 1/2	2	1	41	2	F	17 1/4	4	1/4	4	17 1/4	4	1/4	4	157 1/2	37 1/2
Autocar XXI-F-2—1915-20.....	4	1 1/4	1		3	1 1/4	4	1 1/4					16 1/4	2 1/2	1/4	4	13	2 1/2	1/4	4	91	34
Autocar XXI-G-2—1920.....	4	1 1/4	1		3	1 1/4	4	1 1/4					16 1/4	2 1/2	1/4	4	13	2 1/2	1/4	4	91	34
Autocar XXVI-Y-4—1920.....	3	1 1/4	1		3 1/2	1 1/2	3	1 1/2		48 3/4	1 1/2	F	25 1/2	2 1/2	1/4	4	25 1/2	2 1/2	1/4	4	121	34 1/4
Autocar XXVI-B-4—1920.....	3	1 1/4	1		3 1/2	1 1/2	3	1 1/2		48 3/4	1 1/2	F	25 1/2	2 1/2	1/4	4	25 1/2	2 1/2	1/4	4	176	34 1/4
Available H-1 1/2—1920.....	4	1 1/4	1 1/4		11	1 1/4	14	1 1/4		40	2		48	3 1/2	1/4	4	36	3 1/2	1/4	4	120	32
Available H-2 1/2—1916-20.....	3	1 1/4	1 1/4		11	1 1/4	14	1 1/4		40	2		48	3 1/2	1/4	4	36	3 1/2	1/4	4	144	32
Available H3—1916-20.....	3	1 1/4	1 1/4		11	1 1/4	14	1 1/4		42	2		16	3 1/4	1/4	4	16	3 1/4	1/4	4	168	36
Available H5—1916-20.....	3	1 1/4	1 1/4		12	2	16	2		40	2		18	4	1/4	4	18	4	1/4	4	168	38
Available H7—1919-20.....	3	1 1/4	1 1/4		12	2	16	2		40	2		72	3 1/2	1/4	4	72	3 1/2	1/4	4	168	38
Available H2—1921.....	4	1 1/4	1 1/4	V	12	1 1/4	14	1 1/4		40	2	F	48	3 1/2	1/4	4	36	3 1/2	1/4	4	120	32
Available H2 1/2—1921.....	4	1 1/4	1 1/4	V	12	1 1/4	14	1 1/4		40	2	F	13 1/2	3 1/2	1/4	4	13 1/2	3 1/2	1/4	4	144	32
Available H3 1/2—1921.....	4	1 1/4	1 1/4	V	12	1 1/4	14	1 1/4		42	2	F	16	3 1/4	1/4	4	16	3 1/4	1/4	4	168	36
Available H5—1921.....	4	1 1/4	1 1/4	V	12	2	16	2		40	2	F	18	4	1/4	4	18	4	1/4	4	168	38
Available H7—1921.....	4	1 1/4	1 1/4	V	12	2	16	2		40	2	F	72	3 1/2	1/4	4	72	3 1/2	1/4	4	168	38
Avery 1—1920.....	3	1 1/4	1		10	2	6 1/2	2		31 1/4	1 1/2	F	19 1/2	2	1/4	4	18 1/2	2	1/4	4	85	34
Beck-Hawkeye A-1—1912-20.....	3	1 1/4	1 1/4		1 1/2	1 1/4				24	2		24	2	1/4	4	24	2	1/4	4	114	54
Beck-Hawkeye B 1 1/2—1912-20.....	3	1 1/4	1 1/4		1 1/2	1 1/4				24	2		24	2	1/4	4	24	2	1/4	4	114	54
Beck-Hawkeye C-2—1912-20.....	3	1 1/4	1 1/4		1 1/2	1 1/4				25	2 1/4		25	2 1/4	1/4	4	25	2 1/4	1/4	4	114	54
Beck-Hawkeye D-3—1920.....	3	1 1/4	1 1/4		1 1/2	1 1/4				25	2 1/4		25	2 1/4	1/4	4	25	2 1/4	1/4	4	136	72
Bell M1.....	4	1 1/4	1	V						36	2 1/2		36	2 1/2	1/4	4	42	3	1/4	4	110	34
Bell E-2.....	4	1 1/4	1	V						39	2 1/2		39	2 1/2	1/4	4	48	3	1/4	4	114	34
Bell O-3.....	4	1 1/4	1 1/4							48	2 1/2		48	2 1/2	1/4	4	54	3	1/4	4	126	34
Belmont A-1.....	4	1 1/4	1 1/4							32	2		32	2	1/4	4	31	1 1/2	1/4	4	78	34
Belmont B-1 1/2.....	4	1 1/4	1 1/4							41	2		41	2	1/4	4	40	1 1/2	1/4	4	120	36
Belmont C-2.....	4	1 1/4	1 1/4							41	2		41	2	1/4	4	40	1 1/2	1/4	4	120	36
Bessemer G-1—1917-20.....	3	1 1/4	1	V	10	2 1/4	11 1/2	2 1/4		42	3/8	V	47 1/2	2	1/4	4	45 1/2	2 1/4	1/4	4	98	34

Replacement Table—Continued

Name, Model and Tonnage	ENGINE										BRAKE LINING										FRAME	
	Piston Rings		Carburetor			Upper Hose		Lower Hose		Fan Belt		Service				Emergency				Length	Width	
	No. per Cyl.	Width	Outlet Diameter	Inlet Diameter	Vertical or Horizontal	Length	Width	Length	Width	Length	Width	Type	Length	Width	Thickness	No. of Pieces	Length	Width	Thickness	No. of Pieces	Back of Driver's Seat	Over All
Collier 22-2½—1919-20	3	1½	1½	1½	V	6	1½	10½	1½	40	1	F	27½	3½	1½	4	27½	3½	1½	4	144	32
Columbia G-2½—1920	3	1½	1½	1½	V	11	1½	10	1½	38	1	F	55	3	1½	2	50	2	1½	2	132	32½
Commerce T-1500	3	1½	1½	1½	V	10	1½	10	1½	44	1	F	50	2	1½	2	48½	2	1½	2	92	34
Commerce 12-3000	3	1½	1½	1½	V	10	1½	10	1½	44	1	F	45	2½	1½	2	43	2½	1½	2	99½	34
Commerce 16-4000	3	1½	1½	1½	V	10	1½	10	1½	44	1	F	45	2½	1½	2	43	2½	1½	2	108½	34
Concord A-1½—1920	4	1½	1½	1½	H	11	2½	9½	1½	34	2	F	12	3½	1½	4	12	3½	1½	4	108½	32½
Concord B-2½—1920	4	1½	1½	1½	H	11	2½	9½	1½	34	2	F	13½	3½	1½	4	13½	3½	1½	4	122½	32½
Corbitt E-1—1917-20	3	1½	1½	1½	V	8	1½	14	2	38	1	F	19	2	1½	2	19	2	1½	2	105	34
Corbitt D-1½—1916-20	3	1½	1½	1½	V	8	1½	14	2	38	1	F	45½	1½	1½	1	15	2	1½	1	120	34
Corbitt C-2—1915-20	3	1½	1½	1½	V	14	1½	13	1½	36	1½	F	51½	2½	1½	2	51½	2½	1½	2	138	35
Corbitt B-2½—1916-20	3	1½	1½	1½	V	14	1½	13	1½	36	1½	F	51½	2½	1½	2	51½	2½	1½	2	138	35
Corbitt AA-5—1919-20	3	1½	1½	1½	V	13	1½	8	1½	36	2	F	69½	3	1½	1	69½	3	1½	1	160	38
Corbitt A-3½—1917-20	3	1½	1½	1½	V	13	2	14	2	36	1½	F	64	2½	1½	1	64	2½	1½	1	160	35
Cyclone A-3000	3	1½	1½	1½	V	16	2	16	2	32½	1½	F	15	2½	1½	4	12	2½	1½	2	113	34
Dart H-1—1920-21	3	1½	1½	1½	H	11	2	8	1½	36	1	F	19	1½	1½	4	19	1½	1½	4	102	34
Dart S-1½—1920-21	3	1½	1½	1½	H	11	2	8	1½	36	1	F	19	1½	1½	4	19	1½	1½	4	112	34
Dart M-2½—1920-21	4	1½	1½	1½	H	11	2	14	1½	35	2	F	10	2½	1½	2	19	3½	1½	4	124	34
Dart W-3½—1920-21	4	1½	1½	1½	H	11	2	12	1½	36	2	F	28	2½	1½	4	28	2½	1½	4	144	38
Day-Elder A-1	3	1½	1½	1½	V	9	2	9½	2	40	2	F	19	2	1½	4	19	2	1½	4	108	35
Day-Elder B-1½	3	1½	1½	1½	V	9	2	9½	2	40	2	F	45	2	1½	2	45	2	1½	2	120	35
Day-Elder D-2	3	1½	1½	1½	V	4	1½	2	1½	35	2	F	52	2½	1½	2	52	2½	1½	2	125	35
Day-Elder C-2½	3	1½	1½	1½	V	10½	2	12	1½	36¾	2	F	56½	2½	1½	2	56½	2½	1½	2	123	35
Day-Elder F-3½	3	1½	1½	1½	V	6¾	2	12	1½	35¼	1½	F	69	3	1½	3	69	3	1½	3	148	35
Day-Elder E-5	3	1½	1½	1½	V	12½	2	10	1½	38½	1½	F	18	2½	1½	2	18	1½	1½	2	155	37
Dearborn BW-2—1915-17-19-20	3	1½	1½	1½	V	8¾	2	6	1½	37	1	F	16½	2½	1½	2	16½	1½	1½	2	130	32
Dearborn F-1½—1915-17-19-20	3	1½	1½	1½	V	12	2	8	1½	37	1	F	38	2½	1½	1	38	2	1½	1	96½	32
Dearborn C-1—1915-17-19-20	3	1½	1½	1½	V	10	2	8	1½	40¾	1½	F	45	2½	1½	1	43	2½	1½	1	107	34
Defiance B-1½—1918-19-20	3	1½	1½	1½	V	10	2	8	1½	40¾	1½	F	54	2½	1½	1	52½	2½	1½	1	116	34
Defiance C-2—1918-19-20	3	1½	1½	1½	V	10	2	8	1½	40¾	1½	F	45	2½	1½	1	43	2½	1½	1	116	34
Defiance D—1920-21	3	1½	1½	1½	V	10	2	8	1½	40¾	1½	F	54	2½	1½	1	52½	2½	1½	1	120	34
Defiance E—1920-21	3	1½	1½	1½	V	10	2	8	1½	40¾	1½	F	54	2½	1½	1	52½	2½	1½	1	120	34
Denby 12-1—1921	3	1½	1½	1½	V	12	2	9	2	42	2	F	43	2½	1½	2	40	1½	1½	2	98	34
Denby 33-1½—1921	3	1½	1½	1½	V	12	2	9	2	42	2	F	8½	2	1½	2	46	1½	1½	2	120	34
Denby 134-2—1921	3	1½	1½	1½	V	12	2	9	2	42	2	F	53	3	1½	2	50	1½	1½	2	127	34
Denby 25-3—1921	3	1½	1½	1½	V	12	2	9	2	35	1½	F	56½	3	1½	2	47½	2	1½	2	127	34
Denby 27-4—1921	3	1½	1½	1½	V	13	1½	16½	1½	39¾	1½	F	8½	2	1½	2	58	2½	1½	2	140	34
Denby 210-5—1921	3	1½	1½	1½	V	13	1½	16½	1½	39¾	1½	F	8½	2	1½	2	58	2½	1½	2	140	34
Dependable Dispatch A-1 1921	4	1½	1½	1½	V	14	2½	15	1½	37½	2	F	53½	2½	1½	1	38½	2½	1½	1	108	33½
Dependable C-1½—1920-21	4	1½	1½	1½	V	14	2½	15	1½	37½	2	F	53½	2½	1½	1	38½	2½	1½	1	121	33
Dependable D-2 1920-21	4	1½	1½	1½	V	10	2½	11½	1½	37½	2	F	53½	2½	1½	1	38½	2½	1½	1	140	33
Dependable E-2½—1920-21	4	1½	1½	1½	V	10	2½	11½	1½	37½	2	F	63	2½	1½	1	49	2½	1½	1	152	33
Dependable G-3½ 1921	4	1½	1½	1½	V	13	2	13	1½	37½	2	F	63	2½	1½	1	49	2½	1½	1	170	33
Diamond T-O-1	3	1½	1½	1½	V	9	1½	6	1½	35	2	F	10¾	3	1½	4	10¾	3	1½	4	100	34
Diamond T-FS&T-1½	3	1½	1½	1½	V	9	1½	6	1½	35	2	F	11½	3½	1½	4	11½	3½	1½	4	Opt	34
Diamond T-U-2	3	1½	1½	1½	V	9	1½	6	1½	35	2	F	13¼	3½	1½	4	13¼	3½	1½	4	Opt	34
Diamond TK-3½	3	1½	1½	1½	V	10	1½	10	1½	35	2	F	15¾	3¾	1½	4	15¾	3¾	1½	4	Opt	37
Diamond T-EL-5	3	1½	1½	1½	V	10	1½	10	1½	35	2	F	18	4	1½	4	17	4	1½	4	Opt	37
Diamond T-S-5	3	1½	1½	1½	V	9	2	21	2	40¾	2	F	18	4	1½	4	17	4	1½	4	Opt	37
Diehl A	3	1½	1½	1½	V	9	1½	12	1½	32	1½	F	28	2½	1½	2	27	2	1½	2	90	34
Doane 2½—1917-18-19-20	3	1½	1½	1½	H	12	1½	15	1½	38½	1½	F	35	3	1½	2	18	3½	1½	4	126	58
Doane 3½—1920	3	1½	1½	1½	H	12	1½	15	1½	38½	1½	F	35	3	1½	2	18	3½	1½	4	156	58
Doane 6—1917-18-19-20	3	1½	1½	1½	H	15	1½	17½	1½	43	1½	F	38	3	1½	2	24	4	1½	4	168	64
Dodge Bros.—1920-21	3	1½	1½	1½	V	7	1½	7	1½	31	1	F	19¼	2½	1½	2	14¾	1¾	1½	2	47¾	34
Dorris K-2-2½—1918-20	3	1½	1½	1½	V	2¼	1½	6¼	1½	40¾	1	F	13¼	3½	1½	4	13¼	3½	1½	4	142¾	34
Dorris K7-3½—1919-20-21	3	1½	1½	1½	V	2¼	1½	6¼	1½	40¾	1	F	15¾	3¾	1½	4	15¾	3¾	1½	4	179¼	36
Double Drive B3	4	1½	1½	1½	V	2¼	1½	6¼	1½	40¾	1	F	29	2½	1½	1	29	2½	1½	1	124	36
Douglas GW-1½	3	1½	1½	1½	V	45	2½	44	2½	44	2½	F	45	2½	1½	2	44	2½	1½	2	118	31
Douglas G-1½	3	1½	1½	1½	V	46	2½	44	2½	44	2½	F	55	2½	1½	2	52	2½	1½	2	118	31
Douglas H-2	3	1½	1½	1½	V	54	2½	42	2½	42	2½	F	54	2½								

Replacement Table—Continued

Name, Model and Tonnage	ENGINE										BRAKE LINING										FRAME	
	Piston Rings		Carburetor			Upper Hose		Lower Hose		Fan Belt			Service				Emergency				Length	Width
	No. per Cyl.	Width	Outlet Diameter	Inlet Diameter	Vertical or Horizontal	Length	Width	Length	Width	Length	Width	Type	Length	Width	Thickness	No. of Pieces	Length	Width	Thickness	No. of Pieces	Back of Driver's Seat	Over All
G.M.C. K-101	4	3/4	1 1/4	1 3/8	V	11 3/4	1 3/4	9 1/2	1 3/4	37 7/8	3 1/2	V	17 3/4	4	1/4	4	17 3/4	4	1/4	4	Opt	38
Gove A-1-2 1/2	3	3/4	1 1/4	1 3/8	V	8	1 3/4	4	1 3/4	64	1 1/4	F	54 1/2	2 1/2	1/4	2	24 1/4	2 1/2	1/4	2	119 1/4	34
Graham A.	3	3/4	1 1/4	1 3/8	V	8	1 3/4	4	1 3/4	64	1 1/4	F	54 1/2	2 1/2	1/4	2	24 1/4	2 1/2	1/4	2	140 3/4	33
Gramm-Bernstein 10 Speed—1921.	3	3/4	1 1/4	1 3/8	V	10 1/4	2	6	2	39	1 1/4	F	48 1/2	2	1/4	2	45 1/2	1 1/2	1/4	2	97	30
Gramm-Bernstein 15-1 1/2—1921.	3	3/4	1 1/4	1 3/8	V	10 1/4	2	6	2	39	1 1/4	F	48 1/2	2	1/4	2	45 1/2	1 1/2	1/4	2	120	32
Gramm-Bernstein 65-1 1/2—1921.	3	3/4	1 1/4	1 3/8	V	10 1/4	2	6	2	39	1 1/4	F	48 1/2	2	1/4	2	45 1/2	1 1/2	1/4	2	120	32
Gramm-Bernstein 20-2—1921.	3	3/4	1 1/4	1 3/8	V	4 1/2	1 1/2	12	1 1/2	32	2	F	19 1/4	1 3/4	1/4	4	19 3/4	1 3/4	1/4	4	126	32 1/2
Gramm-Bernstein 25-2 1/2—1921.	3	3/4	1 1/4	1 3/8	V	11	1 1/2	9	1 1/2	33 3/4	2	F	22 3/4	2 1/4	1/4	4	22 3/4	2 1/4	1/4	4	126	32 1/2
Gramm-Bernstein 30—1921.	3	3/4	1 1/4	1 3/8	V	11	1 1/2	9	1 1/2	33 3/4	2	F	22 3/4	2 1/4	1/4	4	22 3/4	2 1/4	1/4	4	129 3/4	36
Gramm-Bernstein 35-3 1/2—1921.	3	3/4	1 1/4	1 3/8	V	11	1 1/2	9	1 1/2	33 3/4	2	F	22 3/4	2 1/4	1/4	4	22 3/4	2 1/4	1/4	4	144	36
Gramm-Bernstein 50-5—1921.	3	3/4	1 1/4	1 3/8	V	23 1/4	2	13 3/4	1 1/2	33 3/4	2	F	28 3/4	2 3/4	1/4	4	28 3/4	2 3/4	1/4	4	162	36
G. W. W.	3	3/4	1 1/4	1 3/8	V	23 1/4	2	13 3/4	1 1/2	33 3/4	2	F	28 3/4	2 3/4	1/4	4	28 3/4	2 3/4	1/4	4	162	36
Hall 2-Worm-2 1/2	3	3/4	1 1/4	1 3/8	V	12	1 3/4	11	1 3/4	40 3/4	3	F	11 1/2	3	1/4	4	11 1/2	3	1/4	4	89	32
Hall 3 1/2-Worm.	3	3/4	1 1/4	1 3/8	V	12 1/2	1 3/4	11 1/2	1 3/4	37	2	F	11 1/2	3	1/4	4	11 1/2	3	1/4	4	144	38
Hall 5-Worm.	3	3/4	1 1/4	1 3/8	V	12 1/2	1 3/4	11 1/2	1 3/4	37	2	F	11 1/2	3	1/4	4	11 1/2	3	1/4	4	180	39
Hall 7-Chain.	3	3/4	1 1/4	1 3/8	V	12 1/2	1 3/4	11 1/2	1 3/4	37	2	F	11 1/2	3	1/4	4	11 1/2	3	1/4	4	144	39
Harvey WEA-1 1/2—1919-20.	4	3/4	1 1/4	1 3/8	V	12 1/2	1 3/4	11 1/2	1 3/4	37	2	F	11 1/2	3	1/4	4	11 1/2	3	1/4	4	144	39
Harvey WFA-2 1/2—1919-20.	4	3/4	1 1/4	1 3/8	V	12 1/2	1 3/4	11 1/2	1 3/4	37	2	F	11 1/2	3	1/4	4	11 1/2	3	1/4	4	144	39
Harvey WHA-3 1/2—1919-20.	4	3/4	1 1/4	1 3/8	V	12 1/2	1 3/4	11 1/2	1 3/4	37	2	F	11 1/2	3	1/4	4	11 1/2	3	1/4	4	144	39
Harvey WKA-5—1919-20.	4	3/4	1 1/4	1 3/8	V	12 1/2	1 3/4	11 1/2	1 3/4	37	2	F	11 1/2	3	1/4	4	11 1/2	3	1/4	4	144	39
Hawkeye K-1 1/2—1918-20.	4	3/4	1 1/4	1 3/8	V	11	2 1/2	9	1 3/4	2	2	F	69	3	1/4	2	69	3	1/4	2	126 1/2	32
Hawkeye M-2—1919-20.	4	3/4	1 1/4	1 3/8	V	11	2 1/2	9	1 3/4	2	2	F	69	3	1/4	2	69	3	1/4	2	144	35
Hendrickson I-2 1/2.	4	3/4	1 1/4	1 3/8	V	11	2 1/2	9	1 3/4	2	2	F	48	2	1/4	2	47	1 1/2	1/4	2	144	35
Hendrickson J-3 1/2.	3	3/4	1 1/4	1 3/8	V	11	2 1/2	9	1 3/4	2	2	F	54	2 1/2	1/4	2	52	2	1/4	2	112	34
Hendrickson K-5.	3	3/4	1 1/4	1 3/8	V	11	2 1/2	9	1 3/4	2	2	F	12	3 1/2	1/4	4	12	3 1/2	1/4	4	112	34
Highway Knight A.	3	3/4	1 1/4	1 3/8	V	16	3 3/4	10	2 3/4	53	3 1/2	V	18	4	1/4	4	18	4	1/4	4	Opt	32 1/2
Highway Knight B-5.	3	3/4	1 1/4	1 3/8	V	16	3 3/4	10	2 3/4	53	3 1/2	V	57	2 1/2	1/4	2	57	2 1/2	1/4	2	Opt	38
Higrade A18-1—1918-19.	3	3/4	1 1/4	1 3/8	V	14	2 3/4	10	2 3/4	53	3 1/2	V	69	3	1/4	2	69	3	1/4	2	147	38
Higrade B20-1 1/2—1919-20.	3	3/4	1 1/4	1 3/8	V	9	2	7	2	32	1 1/2	R	12	1 1/2	1/4	2	12	1 1/2	1/4	2	147	38
Holmes 4WD-2.	3	3/4	1 1/4	1 3/8	V	9	2	7	2	32	1 1/2	R	18	2	1/4	2	18	2	1/4	2	85	32
Huffman B-1 1/2—1919-20.	3	3/4	1 1/4	1 3/8	V	9	2	7	2	32	1 1/2	R	24	2	1/4	2	24	2	1/4	2	100	32
Huffman C-1 1/2—1919-20.	3	3/4	1 1/4	1 3/8	V	9	2	7	2	32	1 1/2	R	24	2	1/4	2	24	2	1/4	2	120	30
Hurlburt A1 1/2-2.	3	3/4	1 1/4	1 3/8	V	9	2	7	2	32	1 1/2	R	44	2 1/4	1/4	2	44	1 1/2	1/4	2	123	32
Hurlburt B2 1/2-4.	3	3/4	1 1/4	1 3/8	V	9	2	7	2	32	1 1/2	R	46	2 1/2	1/4	2	44	2 1/4	1/4	2	123	32
Hurlburt C3 1/2-4.	3	3/4	1 1/4	1 3/8	V	9	2	7	2	32	1 1/2	R	22	2	1/4	2	22	2	1/4	2	132	32
Hurlburt D5-5 1/2.	3	3/4	1 1/4	1 3/8	V	9	2	7	2	32	1 1/2	R	24	2 1/2	1/4	2	23	2 1/2	1/4	2	154	34
Huron-Erie 1 1/2.	4	3/4	1 1/4	1 3/8	V	9	2	7	2	32	1 1/2	R	26	3	1/4	2	25	3	1/4	2	144 1/2	34
Huron-Michigan 2 1/2.	4	3/4	1 1/4	1 3/8	V	9	2	7	2	32	1 1/2	R	28	3	1/4	2	27	3	1/4	2	144 1/2	34
Indiana 12-1 1/2—1920.	3	3/4	1 1/4	1 3/8	V	17	1 1/4	13	1 1/4	38 1/2	1	1	15	3	1/4	2	50	2	1/4	2	121	33
Indiana 20-2—1920.	3	3/4	1 1/4	1 3/8	V	6	1 1/4	13	1 1/4	26 3/4	1 1/2	1	44	2	1/4	2	44	2	1/4	2	145	33
Indiana 25-2 1/2—1920.	3	3/4	1 1/4	1 3/8	V	6	1 1/4	13	1 1/4	26 3/4	1 1/2	1	51	2 1/4	1/4	2	51	2 1/4	1/4	2	108	32
Indiana 35-3 1/2—1920.	3	3/4	1 1/4	1 3/8	V	6	1 1/4	13	1 1/4	26 3/4	1 1/2	1	56	2 1/2	1/4	2	56	2 1/2	1/4	2	126	33
Indiana 51-5—1920.	3	3/4	1 1/4	1 3/8	V	10	1 1/4	17 1/2	1 1/4	26 3/4	1 1/2	1	68	3	1/4	2	68	3	1/4	2	138	33
International S-1500 lbs.—Speed Truck '21	3	3/4	1 1/4	1 3/8	V	9 3/4	2 1/4	17 3/4	2 1/4	30 1/4	1 1/2	F	38	2	1/4	2	36	2	1/4	2	144	34 1/2
International 21-2000 lbs.—1916-21.	3	3/4	1 1/4	1 3/8	V	6	1 1/4	13	1 1/4	26 3/4	1 1/2	F	43 1/4	2 1/4	1/4	2	43 1/4	2 1/4	1/4	2	156	37 1/2
International 31-3000 lbs.—1916-21.	3	3/4	1 1/4	1 3/8	V	6	1 1/4	13	1 1/4	26 3/4	1 1/2	F	50 5/8	2 1/4	1/4	2	50 5/8	2 1/4	1/4	2	75 1/2	34
International 41-4000 lbs.—1918-21.	3	3/4	1 1/4	1 3/8	V	6	1 1/4	13	1 1/4	26 3/4	1 1/2	F	50 5/8	2 1/4	1/4	2	50 5/8	2 1/4	1/4	2	88 1/2	34
International 61-6000 lbs.—1918-21.	4	3/4	1 1/4	1 3/8	V	9	2 1/4	14 1/2	2	38 3/8	1 1/2	F	50 5/8	2 1/4	1/4	2	50 5/8	2 1/4	1/4	2	91 1/2	34
International 101-10,000 lbs.—1920-21	4	3/4	1 1/4	1 3/8	V	9	2 1/4	14 1/2	2	38 3/8	1 1/2	F	73 1/2	2 1/2	1/4	2	73 1/2	2 1/2	1/4	2	118 1/2	34
Jackson B 3 1/2.	3	3/4	1 1/4	1 3/8	V	13	1 3/4	16	1 3/4	32 1/2	1 1/4	F	58 1/2	3 1/2	1/4	2	50	3 1/2	1/4	2	147 1/2	34
J and J D-2—1920.	3	3/4	1 1/4	1 3/8	V	13	1 3/4															

Replacement Table—Continued

Name, Model and Tonnage	ENGINE											BRAKE LINING								FRAME		
	Piston Rings		Carburetor			Upper Hose		Lower Hose		Fan Belt			Service				Emergency				Length	Width
	No. per Cyl.	Width	Outlet Diameter	Inlet Diameter	Vertical or Horizontal	Length	Width	Length	Width	Length	Width	Type	Length	Width	Thickness	No. of Pieces	Length	Width	Thickness	No. of Pieces	Back of Driver's Seat	Over All
Luedinghaus K2—1919-20	3	1 1/4	1 1/4	1 1/4	.....	9	1 1/4	5	1 1/4	.....	1 1/2	F	53.4	2 1/2	1 1/4	2	38 1/2	2 1/2	1 1/4	2	120	34
Luedinghaus K2-LS—1920	3	1 1/4	1 1/4	1 1/4	.....	9	1 1/4	5	1 1/4	.....	1 1/2	F	53.4	2 1/2	1 1/4	2	38 1/2	2 1/2	1 1/4	2	145 1/2	34
Luverne BBL-2	3	1 1/4	1 1/4	1 1/4	.....	9	1 1/4	5	1 1/4	.....	1 1/2	F	53.4	2 1/2	1 1/4	2	38 1/2	2 1/2	1 1/4	2	148	34
Maccar L-1 1/2—1915-20	3	1 1/4	1 1/4	1 1/4	V	3 1/4	1 1/2	10	1 1/4	30 1/4	3 1/4	F	11 1/4	3 1/4	1 1/4	4	11 1/4	3 1/4	1 1/4	4	128 1/8	34
Maccar H-2, 2 1/2—1921	3	1 1/4	1 1/4	1 1/4	V	9 1/2	1 1/2	15 1/2	1 1/4	41 1/2	1 1/2	F	13	3 1/4	1 1/4	4	13	3 1/4	1 1/4	4	143 3/8	34
Maccar M2-3 1/2—1920	3	1 1/4	1 1/4	1 1/4	V	8	1 1/4	13 1/2	1 1/2	37 1/2	2	F	15 1/2	3 1/4	1 1/4	4	15 1/2	3 1/4	1 1/4	4	155 1/2	34
Maccar G-5—1919-20	3	1 1/4	1 1/4	1 1/4	V	10 1/2	2	20 1/2	2	40 1/2	2	F	17 1/4	4	1 1/4	4	17 1/4	4	1 1/4	4	167	37 1/2
MacDonald A-7 1/2	4	1 1/4	1 1/4	1 1/4	V	12	2	21	1 1/4	35	2	F	70	3	1 1/4	1	34	3	1 1/4	1	Opt	33 1/4
Mack AB 1 1/2, 2-Ton-Chain '16-20	4	1 1/4	1 1/4	1 1/4	.....	9 1/2	1 1/4	4 1/4	1 1/4	33	1 1/2	F	12 1/4	4	1 1/4	2	16 1/2	2 1/2	1 1/4	2	Opt	33 1/4
Mack Dual Reduction 1921	4	1 1/4	1 1/4	1 1/4	.....	9 1/2	1 1/4	4 1/4	1 1/4	33	1 1/2	F	18 1/4	3 1/4	1 1/4	4	12	6	1 1/4	2	Opt	33 1/4
Mack AB-Tractor 5 Ton—16-20	4	1 1/4	1 1/4	1 1/4	.....	9 1/2	1 1/4	4 1/4	1 1/4	33	1 1/2	F	12 1/4	4	1 1/4	2	16 1/2	2 1/2	1 1/4	2	Opt	33 1/4
Mack AC 3 1/2 to 7 1/2 ton—16-20	4	1 1/4	1 1/4	1 1/4	.....	5 1/4	2 1/4	4 1/4	1 1/4	.....	1	V	16 1/8	3	1 1/4	4	20 1/2	3 1/2	1 1/4	4	Opt	37 1/2
Mack AC Trac. 7 to 15 Ton—16-20	4	1 1/4	1 1/4	1 1/4	.....	5 1/4	2 1/4	4 1/4	1 1/4	.....	1	V	16 1/8	3	1 1/4	4	20 1/2	3 1/2	1 1/4	4	Opt	37 1/2
Mack AB 3 1/2—1921	4	1 1/4	1 1/4	1 1/4	.....	9 1/2	1 1/4	4 1/4	1 1/4	33	1 1/2	F	12 1/4	4	1 1/4	2	16 1/2	2 1/2	1 1/4	2	Opt	33 1/4
Master J1-1 1/2—1919-20	3	1 1/4	1 1/4	1 1/4	H	13 1/2	2	12 1/2	1 1/4	30 1/4	1	F	7 1/2	2 1/2	1 1/4	1	7 1/2	2 1/2	1 1/4	1	117 3/4	34 1/2
Master JW-1 1/2—1919-21	3	1 1/4	1 1/4	1 1/4	H	13 1/2	2	12 1/2	1 1/4	30 1/4	1	F	12	3 1/4	1 1/4	2	12	3 1/4	1 1/4	2	117 3/4	34 1/2
Master M-2 1/2—1916-20	3	1 1/4	1 1/4	1 1/4	H	13 1/2	2	12 1/2	1 1/4	33	1 1/4	F	7 1/2	2 1/2	1 1/4	1	7 1/2	2 1/2	1 1/4	1	117 3/4	34 1/2
Master O 2 1/2—1917-20	3	1 1/4	1 1/4	1 1/4	H	13 1/2	2	12 1/2	1 1/4	33	1 1/4	F	7 1/2	2 1/2	1 1/4	1	7 1/2	2 1/2	1 1/4	1	156 1/2	34
Master W-2 1/2—1916-21	3	1 1/4	1 1/4	1 1/4	H	13 1/2	2	12 1/2	1 1/4	31	1 1/4	F	13 1/4	3 1/2	1 1/4	2	13 1/4	3 1/2	1 1/4	2	117 3/4	34
Master WL 2 1/2—1917-21	3	1 1/4	1 1/4	1 1/4	H	13 1/2	2	12 1/2	1 1/4	31	1 1/4	F	13 1/4	3 1/2	1 1/4	2	13 1/4	3 1/2	1 1/4	2	156 1/2	34
Master D-2 1/2—1920-21	3	1 1/4	1 1/4	1 1/4	H	13 1/2	2	12 1/2	1 1/4	31	1 1/4	F	8 1/2	3 1/2	1 1/4	2	5 1/4	3	1 1/4	2	117 3/4	34
Master DL-2 1/2—1920-21	3	1 1/4	1 1/4	1 1/4	H	13 1/2	2	12 1/2	1 1/4	31	1 1/4	F	8 1/2	3 1/2	1 1/4	2	5 1/4	3	1 1/4	2	156 1/2	34
Master T-6 Tractor—1917-21	3	1 1/4	1 1/4	1 1/4	H	13 1/2	2	12 1/2	1 1/4	33	1 1/4	F	7 1/2	2 1/2	1 1/4	1	7 1/2	2 1/2	1 1/4	1	72 1/2	34
Master A-3 1/2—1918-21	4	1 1/4	1 1/4	1 1/4	H	13 1/2	2	15	1 1/4	33	1 1/2	F	16	3 1/4	1 1/4	2	16	3 1/4	1 1/4	2	147 3/4	36 1/4
Master AL-3 1/2—1918-21	4	1 1/4	1 1/4	1 1/4	H	13 1/2	2	15	1 1/4	33	1 1/2	F	16	3 1/4	1 1/4	2	16	3 1/4	1 1/4	2	147 3/4	36 1/4
Master E-3 1/2—1920-21	4	1 1/4	1 1/4	1 1/4	H	13 1/2	2	15	1 1/4	33	1 1/2	F	11	6	1 1/4	2	25	4	1 1/4	4	147 3/4	36 1/4
Master EL-3 1/2—1920-21	4	1 1/4	1 1/4	1 1/4	H	13 1/2	2	15	1 1/4	33	1 1/2	F	11	6	1 1/4	2	25	4	1 1/4	4	147 3/4	36 1/4
Master B-5—1919-21	4	1 1/4	1 1/4	1 1/4	H	13 1/2	2	15	1 1/4	35	2	F	18	4	1 1/4	2	18	4	1 1/4	2	162 1/2	39
Master BL-5—1919-21	4	1 1/4	1 1/4	1 1/4	H	13 1/2	2	15	1 1/4	35	2	F	18	4	1 1/4	2	18	4	1 1/4	2	162 1/2	39
Master F-5—1920-21	4	1 1/4	1 1/4	1 1/4	H	13 1/2	2	15	1 1/4	35	2	F	11	6	1 1/4	2	25	4	1 1/4	4	162 1/2	39
Master FL-5—1920-21	4	1 1/4	1 1/4	1 1/4	H	13 1/2	2	15	1 1/4	35	2	F	11	6	1 1/4	2	25	4	1 1/4	4	162 1/2	39
Maxwell 1 1/2—1917-20	3	1 1/4	1 1/4	1 1/4	.....	9 1/2	1 1/4	4 1/4	1 1/4	.....	1	F	16	1 1/4	1 1/4	4	16	1 1/4	1 1/4	4	102	36
Menominee HT-1—1918-20	3	1 1/4	1 1/4	1 1/4	.....	9 1/2	1 1/4	4 1/4	1 1/4	.....	1	F	12	3 1/4	1 1/4	8	12	3 1/4	1 1/4	8	104	32
Menominee H-1 1/2—1916-20	3	1 1/4	1 1/4	1 1/4	.....	9 1/2	1 1/4	4 1/4	1 1/4	.....	1	F	13 1/2	3 1/4	1 1/4	8	13 1/2	3 1/4	1 1/4	8	122	32
Menominee D-2—1915-20	3	1 1/4	1 1/4	1 1/4	.....	9 1/2	1 1/4	4 1/4	1 1/4	.....	1	F	13 1/2	3 1/4	1 1/4	8	13 1/2	3 1/4	1 1/4	8	146	32
Menominee G-3 1/2—1916-20	3	1 1/4	1 1/4	1 1/4	.....	9 1/2	1 1/4	4 1/4	1 1/4	.....	1	F	16	3 1/4	1 1/4	8	16	3 1/4	1 1/4	8	149	36
Menominee J-5—1917-20	3	1 1/4	1 1/4	1 1/4	.....	9 1/2	1 1/4	4 1/4	1 1/4	.....	1	F	18 1/2	4	1 1/4	8	18 1/2	4	1 1/4	8	149	38
Menominee Ht-1—1920-late	3	1 1/4	1 1/4	1 1/4	.....	9 1/4	1 1/4	10 1/2	1 1/4	33 1/4	1 1/4	F	47 1/4	2 1/2	1 1/4	2	33 1/4	2 1/2	1 1/4	2	102 3/4	32
Menominee H-1—1920-late	3	1 1/4	1 1/4	1 1/4	.....	9 1/4	1 1/4	10 1/2	1 1/4	33 1/4	1 1/4	F	47 1/4	2 1/2	1 1/4	2	33 1/4	2 1/2	1 1/4	2	124	32
Menominee D-2—1920-late	3	1 1/4	1 1/4	1 1/4	.....	9 1/4	1 1/4	10 1/2	1 1/4	33 1/4	1 1/4	F	57 1/2	2 1/2	1 1/4	2	42 1/2	2 1/2	1 1/4	2	131 1/2	32
Menominee G-3 1/2—1920-late	3	1 1/4	1 1/4	1 1/4	.....	9 1/4	1 1/4	10 1/2	1 1/4	33 1/4	1 1/4	F	57 1/2	2 1/2	1 1/4	2	42 1/2	2 1/2	1 1/4	2	149	36
Menominee J-5—1920-late	3	1 1/4	1 1/4	1 1/4	.....	9 1/4	1 1/4	10 1/2	1 1/4	33 1/4	1 1/4	F	69 1/4	2 1/2	1 1/4	2	52	2 1/2	1 1/4	2	149	38
Moline	3	1 1/4	1 1/4	1 1/4	.....	10 1/2	2 1/4	4 1/2	2 1/4	.....	2	F	21	2 1/2	1 1/4	2	20	2 1/2	1 1/4	2	108	34
Moreland 21B-1 1/2—1919-20-21	3	1 1/4	1 1/4	1 1/4	.....	10 1/2	2 1/4	4 1/2	2 1/4	.....	2	F	12	3 1/4	1 1/4	4	12	3 1/4	1 1/4	4	132	34
Moreland 21C-2 1/2—1919-20-21	3	1 1/4	1 1/4	1 1/4	.....	10 1/2	2 1/4	4 1/2	2 1/4	.....	2	F	13 1/2	3 1/4	1 1/4	4	13 1/2	3 1/4	1 1/4	4	160	34
Moreland 21H-4—1919-20-21	3	1 1/4	1 1/4	1 1/4	.....	10 1/2	2 1/4	4 1/2	2 1/4	.....	2	F	16	3 1/4	1 1/4	4	16	3 1/4	1 1/4	4	168	38
Moreland 21J-5—1919-20-21	3	1 1/4	1 1/4																			

Replacement Table—Continued

Name, Model and Tonnage	ENGINE										BRAKE LINING								FRAME			
	Piston Rings		Carburetor			Upper Hose		Lower Hose		Fan Belt			Service				Emergency				Length	Width
	No. per Cyl.	Width	Outlet Diameter	Inlet Diameter	Vertical or Horizontal	Length	Width	Length	Width	Length	Width	Type	Length	Width	Thickness	No. of Pieces	Length	Width	Thickness	No. of Pieces	Back of Driver's Seat	Over All
Pierce Arrow-2-X-5.....	3	1 1/4	1 1/4	1 1/4	V	16 3/4	2	14 1/4	1 3/4	43 1/4	1 1/2	F	22 1/4	2 1/4	1 1/4	4	22 1/4	2 1/4	1 1/4	4	125 1/4	34 1/4
Pierce Arrow-3 1/2-W-2.....	3	1 1/4	1 1/4	1 1/4	V	11	2	15 1/2	1 3/4	43 1/4	1 1/2	F	9 1/4	6	1 1/4	4	18	4 3/4	1 1/4	4	133 1/4	38 1/4
Pierce Arrow-5-R-10.....	3	1 1/4	1 1/4	1 1/4	V	11	2	15 1/2	1 3/4	43 1/4	1 1/2	F	9 1/4	6	1 1/4	4	20 3/4	4 3/4	1 1/4	4	139 1/4	38 1/4
Pittsburgher 2 1/2-1919-20.....	3	1 1/4	1 1/4	1 1/4	V	6	1 1/2	12	1 1/4	37	1 1/2	F	52	2 1/4	1 1/4	2	52	2 1/4	1 1/4	2	136	33
Rainier R-8-2.....	3	1 1/4	1 1/4	1 1/4	V	5	1 1/2	13	1 1/4	31 1/2	1 1/4	F	44 1/2	2 1/4	1 1/4	1	44 1/2	2 1/4	1 1/4	2	113	34
Rainier R6-1 1/2.....	3	1 1/4	1 1/4	1 1/4	V	9 3/4	1 1/2	14 3/4	1 1/2	41	1 1/2	F	19	2	1 1/4	2	19	2	1 1/4	2	100	34
Rainier R-19-1.....	3	1 1/4	1 1/4	1 1/4	V	8 1/2	1 1/2	14 3/4	1 1/2	41	1 1/2	F	19	2	1 1/4	2	19	2	1 1/4	2	100	34
Rainier R11-3/4.....	3	1 1/4	1 1/4	1 1/4	V	9	1 1/2	14 3/4	1 1/2	42	1 1/2	F	11 1/4	3	1 1/4	3	11 1/4	3	1 1/4	3	90	34
Ranger TK-20-2.....	3	1 1/4	1 1/4	1 1/4	H	11 3/4	1 1/2	10	1 1/4	33 3/4	1	F	11 1/2	3 3/4	1 1/4	2	11 1/2	3 3/4	1 1/4	2	106 1/2	33
Reliance 10A-1 1/2-1920.....	4	1 1/4	1 1/4	1 1/4	V	10 1/2	2	13 1/2	1 3/4	35	2	F	17	2	1 1/4	4	17	2	1 1/4	4	122	32
Reliance 20B-2 1/2-1920.....	4	1 1/4	1 1/4	1 1/4	V	10 1/2	2	13 1/2	1 3/4	35	2	F	17	2	1 1/4	4	17	2	1 1/4	4	127	32
Reo F-1500-2500-lbs.....	3	1 1/4	1 1/4	1 1/4	V	5 1/2	1	5 1/2	1	39	1 1/2	F	43	2 1/4	1 1/4	1	39 3/4	2 1/4	1 1/4	1	82	30
Republic 10-1-10E-1-1919-20-21.....	3	1 1/4	1 1/4	1 1/4	V	12 1/2	2	6	2	40 1/4	1 1/4	F	20 1/4	2 1/4	1 1/4	4	19 3/4	2 1/4	1 1/4	4	98	34
Republic 11X-1 1/2-1919-20-21.....	3	1 1/4	1 1/4	1 1/4	V	12 1/2	2	6	2	40 1/4	1 1/4	F	54 1/4	2 1/4	1 1/4	2	24 1/4	2 1/4	1 1/4	4	118	34
Republic 19-2 1/2-1919-20-21.....	3	1 1/4	1 1/4	1 1/4	V	8	1 1/2	11 3/4	1 1/4	32	1 1/2	F	54 1/4	2 1/4	1 1/4	2	24 1/4	2 1/4	1 1/4	4	121	34
Republic 20-3 1/2-1919-20-21.....	3	1 1/4	1 1/4	1 1/4	V	7 1/4	1 1/2	11 3/4	1 1/4	36 1/4	1 1/2	F	55 1/4	3 1/2	1 1/4	2	30 1/4	3 1/2	1 1/4	1	146	37
Republic 75-3/4-1921.....	3	1 1/4	1 1/4	1 1/4	V	12	2 1/4	18 1/2	2 1/4	31 1/2	1	F	19	2	1 1/4	4	18	2	1 1/4	4	95	31
Reynolds 3A-1 1/2.....	3	1 1/4	1 1/4	1 1/4	V	12	2	18 1/2	2 1/4	31 1/2	1	F	46	2	1 1/4	2	46	2	1 1/4	2	121	33
Reynolds 5A-2 1/2.....	3	1 1/4	1 1/4	1 1/4	V	12	2	18 1/2	2 1/4	31 1/2	1	F	52 1/2	2 1/4	1 1/4	2	52 1/2	2 1/4	1 1/4	2	126	33
Reynolds 7A-3 1/2.....	3	1 1/4	1 1/4	1 1/4	V	12	2	18 1/2	2 1/4	31 1/2	1	F	57	2 1/4	1 1/4	2	57	2 1/4	1 1/4	2	148	37
Reynolds 10A-5.....	3	1 1/4	1 1/4	1 1/4	V	12	2	18 1/2	2 1/4	31 1/2	1	F	70	3	1 1/4	2	70	3	1 1/4	2	148	37
Riker B3, BB-4.....	5	1 1/4	1 1/4	1 1/4	V	9 3/4	1 1/2	8	1 1/4	49 1/2	1 1/4	V	7 1/4	4 1/2	1 1/4	2	20	4	1 1/4	4	150	38
Rowe CW-1 1/2-1918-19-20.....	3	1 1/4	1 1/4	1 1/4	V	10 1/2	2	10 1/2	1 1/2	32 1/2	1 1/2	F	19	2	1 1/4	8	19	2	1 1/4	8	113	33
Rowe CDW2-1916-20.....	3	1 1/4	1 1/4	1 1/4	V	10 1/2	2	10 1/2	1 1/2	32 1/2	1 1/2	F	45	2	1 1/4	4	45	2	1 1/4	4	123	33
Rowe GSW3-1918-20.....	3	1 1/4	1 1/4	1 1/4	V	20	2 1/4	15 1/2	1 1/2	36 1/4	2	F	51 1/2	2 1/4	1 1/4	4	51 1/2	2 1/4	1 1/4	4	140	33
Rowe HW4-1918-20.....	3	1 1/4	1 1/4	1 1/4	V	20	2 1/4	15 1/2	1 1/2	36 1/4	2	F	56 1/2	2 1/4	1 1/4	4	56 1/2	2 1/4	1 1/4	4	146	36
Rowe FW5-1914-20.....	3	1 1/4	1 1/4	1 1/4	V	20	2 1/4	15 1/2	1 1/2	36 1/4	2	F	68	3	1 1/4	4	68	3	1 1/4	4	153	38 1/4
Rowe GPW3-1916-17, 1919-20.....	3	1 1/4	1 1/4	1 1/4	V	10	1 1/4	6	1 1/4	37	2	F	18	2	1 1/4	4	18	2	1 1/4	4	152	33
Rumely A-1 1/2.....	4	1 1/4	1 1/4	1 1/4	V	10 1/2	2	10 1/2	1 1/2	37	2	F	20	2	1 1/4	2	20	2	1 1/4	2	122	34
Sandow G-1-1918-20.....	3	1 1/4	1 1/4	1 1/4	V	10 1/2	2	10 1/2	1 1/2	37	2	F	20	2	1 1/4	2	20	2	1 1/4	2	96	34
Sandow CG-1 1/2-1918-20.....	3	1 1/4	1 1/4	1 1/4	V	10 1/2	2	10 1/2	1 1/2	37	2	F	20	2	1 1/4	2	20	2	1 1/4	2	120	34
Sandow I-2-1918-20.....	3	1 1/4	1 1/4	1 1/4	V	10 1/2	2	10 1/2	1 1/2	37	2	F	60	3	1 1/4	1	60	3	1 1/4	1	132	32
Sandow J-2 1/2-1918-20.....	3	1 1/4	1 1/4	1 1/4	V	10 1/2	2	10 1/2	1 1/2	37	2	F	13 1/2	3 1/2	1 1/4	2	16	3 1/2	1 1/4	2	144	32
Sandow L-5-1918-20.....	3	1 1/4	1 1/4	1 1/4	V	10 1/2	2	10 1/2	1 1/2	37	2	F	24	4 1/2	1 1/4	2	24	4 1/2	1 1/4	2	144	37
Sandow M-3 1/4-1918-20.....	3	1 1/4	1 1/4	1 1/4	V	10 1/2	2	10 1/2	1 1/2	37	2	F	18 1/4	4	1 1/4	2	18 1/4	4	1 1/4	2	144	37
Sanford 25-2 1/2-1917-20.....	3	1 1/4	1 1/4	1 1/4	V	20	2 1/4	15 1/2	1 1/2	36 1/4	2	F	51 1/2	2 1/4	1 1/4	2	51 1/2	2 1/4	1 1/4	2	144	35
Sanford W35-2 1/2-1917-20.....	3	1 1/4	1 1/4	1 1/4	V	20	2 1/4	15 1/2	1 1/2	36 1/4	2	F	56	2 1/4	1 1/4	2	56	2 1/4	1 1/4	2	145	35
Sanford W50-5-1917-20.....	3	1 1/4	1 1/4	1 1/4	V	20	2 1/4	15 1/2	1 1/2	36 1/4	2	F	69	3	1 1/4	2	69	3	1 1/4	2	145	35
Schacht 2.....	3	1 1/4	1 1/4	1 1/4	V	12	2	12	1 1/4	41	1 1/2	F	8 1/2	3 1/2	1 1/4	4	13 1/2	3	1 1/4	4	140	35 1/4
Schacht 2 1/2.....	3	1 1/4	1 1/4	1 1/4	V	12	2	12	1 1/4	41	1 1/2	F	8 1/2	3 1/2	1 1/4	4	13 1/2	3	1 1/4	4	140	35 1/4
Schacht 3 1/2.....	4	1 1/4	1 1/4	1 1/4	V	12	2	12	1 1/4	41	1 1/2	F	8 1/2	3 1/2	1 1/4	4	13 1/2	3	1 1/4	4	152	35 1/4
Schacht 5.....	4	1 1/4	1 1/4	1 1/4	V	12	2	12	1 1/4	41	1 1/2	F	8 1/2	3 1/2	1 1/4	4	15	4	1 1/4	4	152	35 1/4
Selden 1 1/2 A-1919-20.....	3	1 1/4	1 1/4	1 1/4	V	12	2	12	1 1/4	41	1 1/2	F	11 1/4	3 1/4	1 1/4	2	11 1/4	3 1/4	1 1/4	4	114	34
Selden 2 1/2 A-1920.....	3	1 1/4	1 1/4	1 1/4	V	9 3/4	1 1/2	12	1 1/4	34 1/4	2	F	13 3/4	3 1/2	1 1/4	2	13 3/4	3 1/2	1 1/4	4	134	34
Selden 3 1/2 A-1919-20.....	3	1 1/4	1 1/4	1 1/4	V	9 3/4	1 1/2	12	1 1/4	34 1/4	2	F	15 3/4	3 3/4	1 1/4	2	15 3/4	3 3/4	1 1/4	4	153	37 1/4
Selden 5A-1920.....	3	1 1/4	1 1/4	1 1/4	V	10	2	20 3/4	2	40 3/4	2	F	18	4	1 1/4	2	18	4	1 1/4	4	153	37 1/4
Service 15-1921.....	3	1 1/4	1 1/4	1 1/4	V	10	1 3/4	2	1 3/4	35	2	F	19 3/4	1 1/4	1 1/4	4	19 3/4	1 1/4	1 1/4	4	187 1/4	34
Service 220-1-1919-20.....	3	1 1/4	1 1/4	1 1/4	V	10	2	8	1 1/4	33	1 1/4	F	12	3 1/4	1 1/4	2	12	3 1/4	1 1/4	2	109 1/4	34
Service 31-1 1/2-1919-20.....	4	1 1/4	1 1/4	1 1/4																		

Replacement Table—Continued

Name, Model and Tonnage	ENGINE											BRAKE LINING								FRAME		
	Piston Rings		Carburetor		Upper Hose		Lower Hose		Fan Belt			Service				Emergency				Length	Width	
	No. per Cyl.	Width	Outlet Diameter	Inlet Diameter	Vertical or Horizontal	Length	Width	Length	Width	Length	Width	Type	Length	Width	Thickness	No. of Pieces	Length	Width	Thickness	No. of Pieces	Back of Driver's Seat	Over All
Transport 50-2½	3	1½	1½	1½	V	9¼	2	10	1¼	32¾	2	F	50¾	3	1½	2	48½	2½	1½	2	123	34
Transport 70-3½	4	1½	1½	1½	V	12	2	16	1¼	35¾	2	F	50¾	3	1½	2	58	2½	1½	2	150	36½
Traylor B-1½	4	1½	1½	1½	V	12	2	16	1¼	38	1	F	50	3	1½	2	50	2½	1½	2	117	34
Traylor C-2	4	1½	1½	1½	V	12	2	16	1¼	36	2	F	50	3	1½	2	50	2½	1½	2	122	34
Traylor D-3	4	1½	1½	1½	V	12	2	16	1¼	36	2	F	56½	3	1½	2	56½	2½	1½	2	142	34
Traylor E-4	4	1½	1½	1½	V	12	2	16	1¼	37	2	F	59	3	1½	2	59	2½	1½	2	165	35
Traylor F-5	4	1½	1½	1½	V	12	2	16	1¼	37	2	F	59	3	1½	2	59	2½	1½	2	165	35
Triangle AA-¾—1920	3	1	1	1	H	17	3	17	3	34	1	F	22	2	1½	1	41	2	1½	2	94	35
Triangle A-1½—1918-20	3	1	1	1	V	14	1½	14½	1½	39¼	1½	F	7	4	1½	2	49	2	1½	2	126	34
Triangle B-2½—1919-20	3	1	1	1	V	18	1½	18	1½	39¼	1½	F	7	4	1½	2	52	2	1½	2	132	34
Triangle C-2—1920	3	1	1	1	V	14	1½	14½	1½	39¼	1½	F	7	4	1½	2	52	2	1½	2	129	34
Triumph HB-2½	4	1½	1½	1½	V	9	1½	17	1½	32½	2	F	46	2½	1½	2	32	2½	1½	2	120	34½
Triumph HC-2	4	1½	1½	1½	V	9	1½	17	1½	32½	2	F	46	2½	1½	2	32	2½	1½	2	120	34½
Twin City 2	3	1½	1½	1½	V	11	2	13	1½	36¾	2	F	50	3	1½	2	48	2	1½	2	132	33
Twin City 3½	4	1½	1½	1½	V	8	1½	8	1½	36¾	2	F	15	3¾	1½	2	15	2	1½	2	156	36
Ultimate A-2—1920	4	1½	1½	1½	V	11	2	8	1½	34	2	F	45	2	1½	2	45	2	1½	2	126	32½
Ultimate AJ2—1920	4	1½	1½	1½	V	11	2	8	1½	34	2	F	45	2	1½	2	45	2	1½	2	126	32½
Ultimate AJL-2-1920	4	1½	1½	1½	V	11	2	8	1½	34	2	F	45	2	1½	2	45	2	1½	2	150	32½
Ultimate B-3—1920	4	1½	1½	1½	V	11	2	8	1½	34	2	F	51	2½	1½	2	51	2	1½	2	144	32½
Ultimate BL3—1920	4	1½	1½	1½	V	11	2	8	1½	34	2	F	51	2½	1½	2	51	2	1½	2	192	32½
Union F-2½	3	1½	1½	1½	V	20	1½	19½	1½	37¾	2	F	55	3	1½	1	50	2	1½	1	133½	32
Union FW-2½	3	1½	1½	1½	V	20	1½	19½	1½	37¾	2	F	26	4½	1½	1	52	3	1½	1	133½	32
Union H-4	3	1½	1½	1½	V	20	1½	19½	1½	37¾	2	F	56¾	3½	1½	1	32	4½	1½	1	157½	34
Union HW-4	3	1½	1½	1½	V	20	1½	19½	1½	37¾	2	F	26	4½	1½	1	24	4	1½	1	157½	34
Union JW-6	3	1½	1½	1½	V	20	1½	19½	1½	41½	2	F	34	4	1½	1	28	5	1½	1	190	36
United 1½	1	1	1	1	V	15	2	16	1½	37½	2	F	48	2	1½	1	48	1½	1½	1	120	33
United-2½	1	1	1	1	V	7	2½	12	1½	37½	2	F	49	3	1½	1	40	2½	1½	1	Opt	33
United 3½	1	1	1	1	V	7	2½	12	1½	37½	2	F	62	3	1½	1	58	2½	1½	1	Opt	33
United 5	1	1	1	1	V	14½	2	12	1½	37½	2	F	88½	2½	1½	1	88½	2½	1½	1	Opt	38
U.S.N.-1½	3	1½	1½	1½	H	11½	2	9	1½	37	1½	F	50	2½	1½	2	46½	2½	1½	2	120	34
U.S.R.-2½-3	3	1½	1½	1½	V	10	1½	9	1½	35	1½	F	46	2½	1½	2	46	2½	1½	2	144	34
U.S.S.-3½-4	3	1½	1½	1½	V	9	1½	8	1½	37	1½	F	50	2½	1½	2	50	2½	1½	2	156	36
U.S.T.-5-6	3	1½	1½	1½	V	15	2	13	1½	38¾	2	F	62	3	1½	1	33	4	1½	1	168	36
Velie 46-1½—1921	3	1½	1½	1½	V	9½	2½	12½	1½	40	1	V	54	2½	1½	2	52½	2½	1½	2	120	31
Vim 29-½	3	1½	1½	1½	V	1	1½	1	1½	30¾	1	F	14½	1½	1½	4	14½	1½	1½	4	64	30
Vim 30-½	3	1½	1½	1½	V	1	1½	1	1½	30¾	1	F	14½	1½	1½	4	14½	1½	1½	4	83½	30
Vim 31-1	4	1½	1½	1½	V	1	1½	1	1½	40	1	F	18	2	1½	2	18	2	1½	2	92	32
Vim 22-2	4	1½	1½	1½	V	1	1½	1	1½	40	1	F	42½	2	1½	2	42½	2	1½	2	120½	34
Vim 23-3	5	1½	1½	1½	V	1	1½	1	1½	40	1	F	48½	2½	1½	2	48½	2½	1½	2	160	34
Walker M½	1	1	1	1	V	1	1½	1	1½	43	1	F	43	2½	1½	2	14	1½	1½	2	90	32
Walker K1	1	1	1	1	V	1	1½	1	1½	45½	1	F	45½	2½	1½	2	16	2	1½	2	96	32
Walker L2	1	1	1	1	V	1	1½	1	1½	53½	1	F	53½	2½	1½	2	19	2	1½	2	120	32
Walker P3½	1	1	1	1	V	1	1½	1	1½	53½	1	F	53½	3	1½	2	19	2½	1½	2	140	35
Walker N5	1	1	1	1	V	1	1½	1	1½	53½	1	F	53½	3	1½	2	19	2½	1½	2	162	35
W.J.-B2½	4	1½	1½	1½	V	10	1½	18	1½	39	1½	F	13	3½	1½	4	13	3½	1½	4	133	32½
Walter S-5	3	1½	1½	1½	V	7	1½	16	1½	41½	1½	F	15	5	1½	4	57	3½	1½	4	136	36
Ward LaFrance 2B-2½—1920	3	1½	1½	1½	V	8½	1½	18	1½	41½	1½	F	13	3½	1½	4	13	3½	1½	4	136	33
Ward LaFrance 4A-3½—1920	3	1½	1½	1½	V	8½	1½	18	1½	41½	1½	F	15½	3½	1½	4	15½	3½	1½	4	170	37
Ward LaFrance 5A-5—1920	3	1½	1½	1½	V	9¼	1½	18	1½	41½	1½	F	18	4	1½	4	18	4	1½	4	170	37
Ward WS2	1	1	1	1	V	1	1½	1	1½	14½	1½	F	14½	1½	1½	8	14½	1½	1½	8	66	33
Ward WA	1	1	1	1	V	1	1½	1	1½	18	2	F	18	2	1½	8	18	2	1½	8	95	33
Ward WB	1	1	1	1	V	1	1½	1	1½	19½	2	F	19½	2	1½	8	19½	2	1½	8	120	33½
Ward WD	1	1	1	1	V	1	1½	1	1½	49½	2½	F	49½	2½	1½	4	49½	2½	1½	4	144	34
Ward WF	1	1	1	1	V	1	1½	1	1½	55	2½	F	55	2½	1½	4	55	2½	1½	4	168	34½
Ward WH	1	1	1	1	V	1	1½	1	1½	68¾	3	F	68¾	3	1½	4	68¾	3	1½	4	192	37
Watson B1	4	1½	1½	1½	V	16½	1½	4	1½	40	1½	F	41	1½	1½	2	41	1½	1½	2	90½	30
Watson N-3½	3	1½	1½	1½	V	16½	1½	3	1½	34	1½	F	62	2½	1½	4	47	2½	1½	4	147	37
Watson U-5	3	1½	1½	1½	V	16½	1½	3	1½	38½	1½	F	15½	3½	1½	4	15½	3½	1½	4	157	36
White 15-¾	3	1½	1½	1½	V	1	1½	1	1½	1	1½	F	1	1½	1½	4	1	1½	1½	4	85½	34
White 20-2	3	1½	1½	1½	V	1	1½	1	1½	1	1½	F	1	1½	1½	4	1	1½	1½	4	107½	34
White 40-3	3	1½	1½	1½	V	1	1½	1	1½	1	1½	F										

KEY OF ABBREVIATIONS

Note: Numerals on This Page Correspond With Numerals at Head of Specification Columns on Page Following. In All Specifications—O, Own; Op or Opt, Optional

1	Engine: Beav—Beaver Cont—Continental GBS—Golden, Belknap & Gr-B—Gray-Beal [Swartz] Her—Hercules Hig—Highway Hin—Hinkley HSp—Herschell-Spillman LeR—Le Roi Lib—Liberty LMF—Light Mfg. & Fdy. Lyc—Lycoming Mid—Midwest Rut—Rutenber Ster—Sterling Sup—Supreme TC—Twin City Vict—Victory Wau—Waukesha Wei—Weidely Wis—Wisconsin	2	Valve Arrangement: H—Overhead L—ELL-Head T—TEE-Head S—Sleeve	3	How Cooled: A—Air B—Pump & Thermo C—Centrifugal G—Gear Pump T—Thermo-Syphon	4	Radiator (Make): BW—B & W Bm—Brenem Bus—Bush Can—Candler Chic—Chicago EM—English-Mersick Eur—Eureka Fed—Fedders Flex—Flexo GO—G. & O. Har—Harrison Hoo—Hooven Idl—Ideal Jam—Jamestown Kue—Kuenz Liv—Livingston Lng—Long McC—McCord May—Mayo Mod—Modine Per—Perfex R-T—Rome-Turney S-W—Sparks-Withington Spar—Spartan Spec—Special Spli—Splitex Stan—Standard Whee—Wheeler	5	Radiator (Type): C—Cellular H—Honeycomb	6	Lubrication: PT—Plain Tube ZZT—Zig Zag Tube FIN—Fin Tube FS—Force and Splash F—Force Feed S—Splash Carburetor: B&B—Ball & Ball Bent—Bennett Cent—Carter Eag—Eagle Ens—Ensign Fich—Fletcher Holl—Holley John—Johnson King—Kingston Mar—Marvel Mas—Master Mill—Miller Rayf—Rayfield Scoe—Scoe Strm—Stromberg Shk—Shakespeare Sheb—Schebler Stew—Stewart Till—Tillotson Zen—Zenith	7	Fuel Feed: G—Gravity P—Pressure V—Vacuum	8	Governor: Con—Continental Del—Delancy Dup—Duplex Hin—Hinkley Mer—Merrill McC—McCanna Mon—Monarch Phar—Pharo Pier—Pierce Rug—Ruggles Sim—Simplex Wau—Waukesha	9	Clutch (Make): B. B.—Borg & Beck B-Li.—Brown-Lipe Covt.—Covert Det—Detlaft Full—Fuller D. G.—Detroit Gear & Mach. Hart—Hartford HS—Hele-Shaw M-E—Merchant & Evans Munc.—Muncie M-P—Muncie Products T-D—Twin Disc W-C—Warner Corporation W-Gr—Warner Gear	10	Clutch (Type): D—Disc C—Cone DP—Dry Plate WP—Wet Plate	11	Clutch (Type): D—Disc C—Cone DP—Dry Plate WP—Wet Plate	12	Ignition System: Amr—American AtK—Atwater-Kent Bos—Bosch Ber—Berling Con—Connecticut Del—Delco Eis—Eisemann Exi—Exide Kin—Kingston KW—K. W. Ignition Co. Lor—Lorraine NE—North East POL—Prest-O-Lite Rm—Remy Sim—Simms Spl—Splitdorf Wag—Wagner Wes—Westinghouse	13	Engine Starter: AC—Allis-Chalmers AL—Auto-Lite Bj—Bijur Bos—Bosch DL—Delco Dy—Dyneto GD—Gray & Davis LN—Leece-Neville NE—North East RE—Remy Wg—Wagner USL—U. S. L. W—Westinghouse	14	Gearset: B-Li.—Brown-Lipe Cott—Cotta Covt—Covert D-Sea—Driggs-Seabury Det—Detroit Dun—Dundore Durst—Durst Full—Fuller G-Le—Grant Lees MM—Mechanics Mach. Co. Munc.—Muncie M-P—Muncie Products Rock—Rockford W-C—Warner Corporation W-Gr—Warner Gear	15	Location of Gearset: A—Amidships R—Rear U—Unit with engine J—Unit with jackshaft Universal: A-B—Easton Mch. Co. Acm—Acme Arv—Arvac Bear—Bearings Co. Bld—Blood Brothers Det—Detroit Dit—Ditwiler	16	Clutch (Type): D—Disc C—Cone DP—Dry Plate WP—Wet Plate	17	Final Drive: B—Bevel Gear C—Chain I—Internal Gear N—Concentric Spur P—Spur R—Double Reduction S—Spiral Bevel W—Worm	18	Rear Axle (Make): Amr—American Badg—Badger Col—Columbia Stan—Chicago Cl—Clark Dun—Dunkirk Eat—Eaton, Stan-Par Hind—Hindley Ir.M—Iron Mt. Ken—Kenosha Ken—Kennedy	19	Rear Axle (Type): Flot—Floating 1/2-F1—Semi-Floating 3/4-F1—3/4-Floating D—Dead	20	Steering Gear: CAS—C. A. S. Products Co. Dit—Ditwiler Gem—Gemmer Jac—Jacox Lav—Lavine M-P—Muncie Products Ros—Ross W-C—Warner Corporation Woh—Wohlrab	21	Wheels: Arc—Archibald AuW—Auto Wheel Bim—Bimel Cla—Clark C&M—Crane & McMahon Day—Dayton Det—Detroit E&O—Eberly & Oris Hay—Haynes Hoo—Hoopes Brothers Jon—Jones Kel—Kelsey Mot—Motor Wheel Mut—Mutual Nor—Northern Pru—Prudden Roy—Royer Rus—Russell Sal—Salisbury Sch—Schwartz Smi—Smith Sta—Stanwell StM—St. Mary Stn—Standard Wal—Walker Wan—Wayne W-L—Waterhouse & Lester Wes—Western Wheel Co	22	Rim Equipment: Bak—Baker Det—Detroit Fir—Firestone Gdy—Goodyear Jax—Jaxon Kel—Kelsey Stn—Stanwell	23	Rim Equipment: Bak—Baker Det—Detroit Fir—Firestone Gdy—Goodyear Jax—Jaxon Kel—Kelsey Stn—Stanwell
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Commercial Car Specifications—Corrected Monthly

The Specifications, Chassis Prices, Etc., Are Corrected Each Month From Data Supplied Direct by the Makers. Gasoline Tractor-Trucks Will be Found at the End of Gasoline Commercial Cars

See Also Replacement Table in "Service and Repair Departments." Truck Frame Dimensions Are Included in Replacement Table

(Where prices are not given it is because we have been unable to get them from authoritative sources)

* An asterisk in front of the model name indicates that corrections have been made somewhere in the specifications since the previous month

Trade Name and Model	Chassis Price	ENGINE DETAILS										GEARSET		REAR AXLE		Steering Gear (Make)	TIRES, WHEELS, RIMS		Chassis Weight	Wheelbase	P. Cent of Weight on Rear Wheels																
		Make and Model	Bore and Stroke	N. A. C. C.	Horsepower	Valve Arrang't	How Cooled	Radiator (Make)	Radiator (Type)	Lubrication	Carburetor	Fuel Feed	Governor (Make)	Clutch (Make)	Clutch (Type)		Ignition System	Engine Starter				Make	Location	Speeds	Universal (Make)	Springs (Make)	Final Drive	Type	Total Gear Re-duction in High	Total Gear Re-duction in Low	Front	Rear	Wheels (Make)	Rim Equipment			
1000 Pounds																																					
*Dodge Brothers	885	Own	3 1/2 x 4 1/2	24	L	C	McC	PT	FS	Stew	V	W	Full	DD	Own	NE	W	Tim	S	Math	Own	U	3	UM	Spic	Spic	10.4	19.4	Own	33x4	33x4	33x4	Day	Kel	1990	114	66.5
Seneca M.	1020	Left	3 1/2 x 4 1/2	15.6	L	T	McC	PT	FS	Shel	V	W	Full	DD	Own	AC	W	Tim	W	Math	Own	U	3	UM	Spic	Spic	14.45	14.45	Own	31x4	31x4	31x4	Hoo	Jax	1700	108	80
Vim 20	1355	Own	3 1/2 x 4 1/2	15.6	L	T	McC	PT	FS	Shel	V	W	Full	DD	Own	W	W	W	W	Shel	Own	U	3	UM	Spic	Spic	5.5	5.5	Own	32x4 1/2	32x4 1/2	32x4 1/2	Hoo	Fir	2175	108	
Vim 30	1550	Own	3 1/2 x 4 1/2	15.6	L	T	McC	PT	FS	Shel	V	W	Full	DD	Own	W	W	W	W	Shel	Own	U	3	UM	Spic	Spic	5.5	5.5	Own	32x4 1/2	32x4 1/2	32x4 1/2	Hoo	Fir	2290	127	
1500 Pounds																																					
Acson Fast	1650	Own	3 3/4 x 5	22.5	L	T	GO	C	F	Shel	V	W	Full	DD	Own	W	W	W	W	Shel	Own	U	3	UM	Spic	Spic	6.25	25	Own	34x5	34x5	34x5	Day	Kel	3080	142	
Aene G.	1650	Own	3 3/4 x 5	22.5	L	T	GO	C	F	Shel	V	W	Full	DD	Own	W	W	W	W	Shel	Own	U	3	UM	Spic	Spic	6.2	24.8	Own	35x5	35x5	35x5	Day	Kel	3050	130	50
Bowman L.	1160	Own	3 1/2 x 5	19.6	T	T	GO	C	F	Shel	V	W	Full	DD	Own	W	W	W	W	Shel	Own	U	3	UM	Spic	Spic	5.1	25	Own	33x4	33x4	33x4	Day	Kel	2700	114	
Brockway E.	1675	Own	3 1/2 x 5	19.6	T	T	GO	C	F	Shel	V	W	Full	DD	Own	W	W	W	W	Shel	Own	U	3	UM	Spic	Spic	5.1	25	Own	33x4	33x4	33x4	Day	Kel	3450	135	70
Clydesdale 18	820	Own	3 1/2 x 4 1/2	21.7	H	T	GO	C	F	Shel	V	W	Full	DD	Own	W	W	W	W	Shel	Own	U	3	UM	Spic	Spic	5.1	25	Own	31x4	31x4	31x4	Hoo	Jax	2167	120	
G. M. C. K-15	1890	Own	3 3/4 x 5	22.5	L	T	GO	C	F	Shel	V	W	Full	DD	Own	W	W	W	W	Shel	Own	U	3	UM	Spic	Spic	5.1	25	Own	34x5	34x5	34x5	Day	Kel	3200	136	
Garford 15	1495	Own	3 3/4 x 5	19.6	L	T	GO	C	F	Shel	V	W	Full	DD	Own	W	W	W	W	Shel	Own	U	3	UM	Spic	Spic	6.25	16.6	Own	33x4 1/2	33x4 1/2	33x4 1/2	Day	Kel	3225	132	64
Globe D-20	2200	Own	3 3/4 x 5	19.6	L	T	GO	C	F	Shel	V	W	Full	DD	Own	W	W	W	W	Shel	Own	U	3	UM	Spic	Spic	6.25	21.12	Own	33x4 1/2	33x4 1/2	33x4 1/2	Day	Kel	3500	132	
H. R. L. L.	1500	Own	3 3/4 x 5	19.6	L	T	GO	C	F	Shel	V	W	Full	DD	Own	W	W	W	W	Shel	Own	U	3	UM	Spic	Spic	6.2	22	Own	33x4 1/2	33x4 1/2	33x4 1/2	Day	Kel	2600	120	50
Internat'l Speed Truck S.	1600	Own	3 3/4 x 5	19.6	L	T	GO	C	F	Shel	V	W	Full	DD	Own	W	W	W	W	Shel	Own	U	3	UM	Spic	Spic	6.2	22	Own	33x4 1/2	33x4 1/2	33x4 1/2	Day	Kel	3300	134	
Kearns M.	2200	Own	3 3/4 x 5	19.6	L	T	GO	C	F	Shel	V	W	Full	DD	Own	W	W	W	W	Shel	Own	U	3	UM	Spic	Spic	6.5	19	Own	34x5	34x5	34x5	Day	Kel	2900	121	80
Lycro-Int'l	1350	Own	3 3/4 x 5	19.6	L	T	GO	C	F	Shel	V	W	Full	DD	Own	W	W	W	W	Shel	Own	U	3	UM	Spic	Spic	6.5	19	Own	34x5	34x5	34x5	Day	Kel	2800	118	65
L. M. F. H	1600	Own	3 3/4 x 5	19.6	L	T	GO	C	F	Shel	V	W	Full	DD	Own	W	W	W	W	Shel	Own	U	3	UM	Spic	Spic	6.5	19	Own	34x5	34x5	34x5	Day	Kel	2900	121	80
Napoleon 7	2150	Own	3 3/4 x 5	19.6	L	T	GO	C	F	Shel	V	W	Full	DD	Own	W	W	W	W	Shel	Own	U	3	UM	Spic	Spic	6.5	19	Own	34x5	34x5	34x5	Day	Kel	2800	121	80
Rainier R11	1395	Own	3 3/4 x 5	19.6	L	T	GO	C	F	Shel	V	W	Full	DD	Own	W	W	W	W	Shel	Own	U	3	UM	Spic	Spic	6.5	19	Own	34x5	34x5	34x5	Day	Kel	2800	121	80
Republic 75	1840	Own	3 3/4 x 5	19.6	L	T	GO	C	F	Shel	V	W	Full	DD	Own	W	W	W	W	Shel	Own	U	3	UM	Spic	Spic	6.5	19	Own	34x5	34x5	34x5	Day	Kel	2800	121	80
Samson 15	1350	Own	3 3/4 x 5	19.6	L	T	GO	C	F	Shel	V	W	Full	DD	Own	W	W	W	W	Shel	Own	U	3	UM	Spic	Spic	6.5	19	Own	34x5	34x5	34x5	Day	Kel	2800	121	80
Service 15	1600	Own	3 3/4 x 5	19.6	L	T	GO	C	F	Shel	V	W	Full	DD	Own	W	W	W	W	Shel	Own	U	3	UM	Spic	Spic	6.5	19	Own	34x5	34x5	34x5	Day	Kel	2800	121	80
Stewart 11	1825	Own	3 3/4 x 5	19.6	L	T	GO	C	F	Shel	V	W	Full	DD	Own	W	W	W	W	Shel	Own	U	3	UM	Spic	Spic	6.5	19	Own	34x5	34x5	34x5	Day	Kel	2800	121	80
Triangle AA	2400	Own	3 3/4 x 5	19.6	L	T	GO	C	F	Shel	V	W	Full	DD	Own	W	W	W	W	Shel	Own	U	3	UM	Spic	Spic	6.5	19	Own	34x5	34x5	34x5	Day	Kel	2800	121	80
Watson B.	2050	Own	3 3/4 x 5	19.6	L	T	GO	C	F	Shel	V	W	Full	DD	Own	W	W	W	W	Shel	Own	U	3	UM	Spic	Spic	6.5	19	Own	34x5	34x5	34x5	Day	Kel	2800	121	80
White 16	2050	Own	3 3/4 x 5	19.6	L	T	GO	C	F	Shel	V	W	Full	DD	Own	W	W	W	W	Shel	Own	U	3	UM	Spic	Spic	6.5	19	Own	34x5	34x5	34x5	Day	Kel	2800	121	80
Yellow Cab M-21	2050	Own	3 3/4 x 5	19.6	L	T	GO	C	F	Shel	V	W	Full	DD	Own	W	W	W	W	Shel	Own	U	3	UM	Spic	Spic	6.5	19	Own	34x5	34x5	34x5	Day	Kel	2800	121	80
1 Ton																																					
Acson R.	2260	Own	3 3/4 x 5 1/2	22.5	L	T	GO	C	F	Shel	V	W	Full	DD	Own	W	W	W	W	Shel	Own	U	4	UM	Spic	Spic	7.2	23.9	Own	36x5	36x5	36x5	Day	Kel	3650	142	
Aene B.	1995	Own	3 3/4 x 5 1/2	22.5	L	T	GO	C	F	Shel	V	W	Full	DD	Own	W	W	W	W	Shel	Own	U	4	UM	Spic	Spic	7.2	23.9	Own	36x5	36x5	36x5	Day	Kel	3750	130	50
Akron Multi-Truck	1995	Own	3 3/4 x 5 1/2	22.5	L	T	GO	C	F	Shel	V	W	Full	DD	Own	W	W	W	W	Shel	Own	U	4	UM	Spic	Spic	7.2	23.9	Own	36x5	36x5	36x5	Day	Kel	3750	130	50
Apex G.	1695	Own	3 3/4 x 5 1/2	22.5	L	T	GO	C	F	Shel	V	W	Full	DD	Own	W	W	W	W	Shel	Own	U	4	UM	Spic	Spic	7.2	23.9	Own	36x5	36x5	36x5	Day	Kel	3750	130	50
Atlas 21	2050	Own	3 3/4 x 5 1/2	22.5	L	T	GO	C	F	Shel	V	W	Full	DD	Own	W	W	W	W	Shel	Own	U	4	UM	Spic	Spic	7.2	23.9	Own	36x5	36x5	36x5	Day	Kel	3750	130	50
Avery	1695	Own	3 3/4 x 5 1/2	22.5	L	T	GO	C	F	Shel	V	W	Full	DD	Own	W	W	W	W	Shel	Own	U	4	UM	Spic	Spic	7.2	23.9	Own	36x5	36x5	36x5	Day	Kel	3750	130	50
Beck Hawkeye A.	1650	Own	3 3/4 x 5 1/2	22.5	L	T	GO	C	F	Shel	V	W	Full	DD	Own	W	W	W	W	Shel	Own	U	4	UM	Spic	Spic	7.2	23.9	Own	36x5	36x5	36x5	Day	Kel	3750	130	50
Bell M.	1650	Own	3 3/4 x 5 1/2	22.5	L	T	GO	C	F	Shel	V	W	Full	DD	Own	W	W	W	W	Shel	Own	U	4	UM	Spic	Spic	7.2	23.9	Own	36x5	36x5	36x5	Day	Kel	3750	130	50
Bell M.	1650	Own	3 3/4 x 5 1/2	22.5	L	T	GO	C	F	Shel	V	W	Full	DD	Own	W	W	W	W	Shel	Own	U	4	UM	Spic	Spic	7.2	23.9	Own	36x5	36x5	36x5	Day	Kel	3750	130	50
Bell M.	1650	Own	3 3/4 x 5 1/2	22.5	L	T	GO	C	F	Shel	V	W	Full	DD	Own	W	W	W	W	Shel	Own	U	4	UM	Spic	Spic	7.2	23.9	Own	36x5	36x5	36x5	Day	Kel	3750	130	50
Bell M.	1650	Own	3 3/4 x 5 1/2	22.5	L	T	GO	C	F	Shel	V	W	Full	DD	Own	W	W	W	W	Shel	Own	U	4	UM	Spic	Spic	7.2	23.9	Own	36x5	36x5	36x5	Day	Kel	3750	130	50
Bell M.	1650	Own	3 3/4 x 5 1/2	22.5	L	T	GO	C	F	Shel	V	W	Full	DD	Own	W	W	W	W	Shel	Own	U	4	UM	Spic	Spic	7.2	23.9	Own	36x5	36x5	36x5	Day	Kel	3750	130	50
Bell M.	1650	Own	3 3/4 x 5 1/2	22.5	L	T	GO	C	F	Shel	V	W	Full	DD	Own	W	W	W	W	Shel	Own	U	4	UM	Spic	Spic	7.2	23.9	Own	36x5	36x5	36x5	Day	Kel	3750	130	50
Bell M.	1650	Own	3 3/4 x 5 1/2	22.5	L	T	GO	C	F	Shel	V	W	Full	DD	Own	W	W	W	W	Shel	Own	U	4	UM	Spic	Spic	7.2	23.9	Own	36x5	36x5	36x5	Day	Kel	3750	130	50
Bell M.	1650	Own	3 3/4 x 5 1/2	22.5	L	T	GO	C	F																												

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Trade Name and Model	Chassis Price	ENGINE DETAILS										GEARSET				REAR AXLE		STEERING GEAR		TIRES, WHEELS, RIMS		Chassis Weight	Wheelbase	Pr. Cent of Weight on Rear Wheels																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
		Bore and Stroke	N. A. C. C. Horsepower	Valve Arrangement	How Cooled	Radiator (Make)	Radiator (Type)	Lubrication	Carburetor	Fuel Feed	Governor (Make)	Clutch (Type)	Ignition System	Engine Starter	Make	Location	Speeds	Universal (Make)	Springs (Make)	Final Drive	Type				Total Gear Reduction in High	Total Gear Reduction in Low	Steering Gear (Make)	Front		Wholes (Make)	Rim Equipment																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
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Trade Name and Model	Chassis Price	ENGINE DETAILS										GEARSET			REAR AXLE		Steering Gear		Tires, Wheels, Rims		Chassis Weight	Wheelbase	Fr. Cent of Gravity on Rear Wheels																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
		Bore and Stroke	N. A. C. C.	Horsepower	Valve Arrangement	How Cooled	Radiator (Make)	Radiator (Type)	Lubrication	Carburetor	Fuel Feed	Governor (Make)	Clutch (Make)	Clutch (Type)	Ignition System	Engine Starter	Make	Location	Speeds	Universal (Make)				Sprockets (Make)	Final Drive	Type	Total Gear Reduction in High	Total Gear Reduction in Low	Front	Rear	Wheels (Make)	Rim Equipment																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
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Ultimate BL	3850	Buda HTU	4 1/2 x 5 1/2	28.9 L	28.9 L	G	C	GO	GO	FS	Shelb	V	Wau	Det	DD	Eis	Opt	Shel	W	4	Spic	Shel	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W

[illegible]

Trade Name and Model	Chassis Price	ENGINE DETAILS										GEARSET				REAR AXLE		TIRES, WHEELS, RIMS		Chassis Weight	Wheelbase	Pr. Cent of Weight on Rear Wheel												
		Make and Model	Bore and Stroke	N. A. C. C.	Valve Arrangem't	How Cooled	Radiator (Make)	Radiator (Type)	Lubrication	Carburetor	Fuel Feed	Governor (Make)	Clutch (Make)	Clutch (Type)	Ignition System	Engine Starter	Make	Location	Speeds				Universal (Make)	Springs (Make)	Final Drive		Type	Total Gear Reduction in High	Total Gear Reduction in Low	Steering Gear (Make)	Tires, Wheels, Rims			
																									Wheels (Make)	Rim Equipment								
5 Ton—Con'd																																		
Kleiber D.	5100	Buda BTU	5 1/2 x 6 1/2	40	L	C	Bus	PT	FS	Strm	G	Sim	B-Li	DD	Bos	W	Timk	1/2 Fl	11.60	56.48	Ros	36x6	40x6	23	9200	180 75	9200	180 75	9200	180 75	9200	180 75	9200	180 75
Larabee-Deyo W.	5200	Cont B2	4 3/4 x 6	36.1	L	C	Bus	PT	FS	Strm	G	Sim	B-Li	DD	Bos	W	Timk	1/2 Fl	11.60	56.48	Ros	36x6	40x6	23	9200	180 75	9200	180 75	9200	180 75	9200	180 75	9200	180 75
Maack AC5	5300	Own AC5	4 3/4 x 6	36.1	L	C	Bus	PT	FS	Strm	G	Sim	B-Li	DD	Bos	W	Timk	1/2 Fl	11.60	56.48	Ros	36x6	40x6	23	9200	180 75	9200	180 75	9200	180 75	9200	180 75	9200	180 75
Master B.	5300	Buda ATU	4 3/4 x 6 1/2	36.1	L	C	Bus	PT	FS	Strm	G	Sim	B-Li	DD	Bos	W	Timk	1/2 Fl	11.60	56.48	Ros	36x6	40x6	23	9200	180 75	9200	180 75	9200	180 75	9200	180 75	9200	180 75
Master BL.	5400	Buda ATU	4 3/4 x 6 1/2	36.1	L	C	Bus	PT	FS	Strm	G	Sim	B-Li	DD	Bos	W	Timk	1/2 Fl	11.60	56.48	Ros	36x6	40x6	23	9200	180 75	9200	180 75	9200	180 75	9200	180 75	9200	180 75
Master F.	5400	Buda ATU	4 3/4 x 6 1/2	36.1	L	C	Bus	PT	FS	Strm	G	Sim	B-Li	DD	Bos	W	Timk	1/2 Fl	11.60	56.48	Ros	36x6	40x6	23	9200	180 75	9200	180 75	9200	180 75	9200	180 75	9200	180 75
Master FL.	5450	Buda ATU	4 3/4 x 6 1/2	36.1	L	C	Bus	PT	FS	Strm	G	Sim	B-Li	DD	Bos	W	Timk	1/2 Fl	11.60	56.48	Ros	36x6	40x6	23	9200	180 75	9200	180 75	9200	180 75	9200	180 75	9200	180 75
Monominee J.	5500	Wis RAU	4 3/4 x 6	36.1	L	C	Bus	PT	FS	Strm	G	Sim	B-Li	DD	Bos	W	Timk	1/2 Fl	11.60	56.48	Ros	36x6	40x6	23	9200	180 75	9200	180 75	9200	180 75	9200	180 75	9200	180 75
Monroe 21J.	5500	Cont B2	4 3/4 x 6	36.1	L	C	Bus	PT	FS	Strm	G	Sim	B-Li	DD	Bos	W	Timk	1/2 Fl	11.60	56.48	Ros	36x6	40x6	23	9200	180 75	9200	180 75	9200	180 75	9200	180 75	9200	180 75
Nelson & LeMoon FC5.	5500	Cont B2	4 3/4 x 6	36.1	L	C	Bus	PT	FS	Strm	G	Sim	B-Li	DD	Bos	W	Timk	1/2 Fl	11.60	56.48	Ros	36x6	40x6	23	9200	180 75	9200	180 75	9200	180 75	9200	180 75	9200	180 75
O'Brien G.	5500	Wis RAU	4 3/4 x 6	36.1	L	C	Bus	PT	FS	Strm	G	Sim	B-Li	DD	Bos	W	Timk	1/2 Fl	11.60	56.48	Ros	36x6	40x6	23	9200	180 75	9200	180 75	9200	180 75	9200	180 75	9200	180 75
Old Reliable D.	5600	Own AC5	4 3/4 x 6	36.1	L	C	Bus	PT	FS	Strm	G	Sim	B-Li	DD	Bos	W	Timk	1/2 Fl	11.60	56.48	Ros	36x6	40x6	23	9200	180 75	9200	180 75	9200	180 75	9200	180 75	9200	180 75
*Oneida E9.	5500	Own AC5	4 3/4 x 6	36.1	L	C	Bus	PT	FS	Strm	G	Sim	B-Li	DD	Bos	W	Timk	1/2 Fl	11.60	56.48	Ros	36x6	40x6	23	9200	180 75	9200	180 75	9200	180 75	9200	180 75	9200	180 75
Packard EF.	5550	Wis RAU	4 3/4 x 6	36.1	L	C	Bus	PT	FS	Strm	G	Sim	B-Li	DD	Bos	W	Timk	1/2 Fl	11.60	56.48	Ros	36x6	40x6	23	9200	180 75	9200	180 75	9200	180 75	9200	180 75	9200	180 75
*Parker M20.	5500	Own AC5	4 3/4 x 6	36.1	L	C	Bus	PT	FS	Strm	G	Sim	B-Li	DD	Bos	W	Timk	1/2 Fl	11.60	56.48	Ros	36x6	40x6	23	9200	180 75	9200	180 75	9200	180 75	9200	180 75	9200	180 75
Pierce Arrow R10.	5700	Own AC5	4 3/4 x 6	36.1	L	C	Bus	PT	FS	Strm	G	Sim	B-Li	DD	Bos	W	Timk	1/2 Fl	11.60	56.48	Ros	36x6	40x6	23	9200	180 75	9200	180 75	9200	180 75	9200	180 75	9200	180 75
Rainier R-17.	5250	Cont B-2	4 3/4 x 6 1/2	36.1	L	C	Bus	PT	FS	Strm	G	Sim	B-Li	DD	Bos	W	Timk	1/2 Fl	11.60	56.48	Ros	36x6	40x6	23	9200	180 75	9200	180 75	9200	180 75	9200	180 75	9200	180 75
Reynolds 10A.	5550	Wis VAU	4 3/4 x 6 1/2	36.1	L	C	Bus	PT	FS	Strm	G	Sim	B-Li	DD	Bos	W	Timk	1/2 Fl	11.60	56.48	Ros	36x6	40x6	23	9200	180 75	9200	180 75	9200	180 75	9200	180 75	9200	180 75
Rowe FW 5.	4975	Cont E4	4 3/4 x 6 1/2	36.1	L	C	Bus	PT	FS	Strm	G	Sim	B-Li	DD	Bos	W	Timk	1/2 Fl	11.60	56.48	Ros	36x6	40x6	23	9200	180 75	9200	180 75	9200	180 75	9200	180 75	9200	180 75
Sandow L.	5100	Cont E4	4 3/4 x 6 1/2	36.1	L	C	Bus	PT	FS	Strm	G	Sim	B-Li	DD	Bos	W	Timk	1/2 Fl	11.60	56.48	Ros	36x6	40x6	23	9200	180 75	9200	180 75	9200	180 75	9200	180 75	9200	180 75
Sanford W50.	5350	Buda YTU	4 3/4 x 6 1/2	36.1	L	C	Bus	PT	FS	Strm	G	Sim	B-Li	DD	Bos	W	Timk	1/2 Fl	11.60	56.48	Ros	36x6	40x6	23	9200	180 75	9200	180 75	9200	180 75	9200	180 75	9200	180 75
Schacht.	5600	Cont B2	4 3/4 x 6 1/2	36.1	L	C	Bus	PT	FS	Strm	G	Sim	B-Li	DD	Bos	W	Timk	1/2 Fl	11.60	56.48	Ros	36x6	40x6	23	9200	180 75	9200	180 75	9200	180 75	9200	180 75	9200	180 75
Selden SA.	5275	Buda YU	4 3/4 x 6 1/2	36.1	L	C	Bus	PT	FS	Strm	G	Sim	B-Li	DD	Bos	W	Timk	1/2 Fl	11.60	56.48	Ros	36x6	40x6	23	9200	180 75	9200	180 75	9200	180 75	9200	180 75	9200	180 75
Service 101.	5300	Cont B2	4 3/4 x 6 1/2	36.1	L	C	Bus	PT	FS	Strm	G	Sim	B-Li	DD	Bos	W	Timk	1/2 Fl	11.60	56.48	Ros	36x6	40x6	23	9200	180 75	9200	180 75	9200	180 75	9200	180 75	9200	180 75
Signal R.	5300	Ster EU	5 1/2 x 6 1/2	40	L	C	Bus	PT	FS	Strm	G	Sim	B-Li	DD	Bos	W	Timk	1/2 Fl	11.60	56.48	Ros	36x6	40x6	23	9200	180 75	9200	180 75	9200	180 75	9200	180 75	9200	180 75
Standard 5K.	5250	Ster EU	5 1/2 x 6 1/2	40	L	C	Bus	PT	FS	Strm	G	Sim	B-Li	DD	Bos	W	Timk	1/2 Fl	11.60	56.48	Ros	36x6	40x6	23	9200	180 75	9200	180 75	9200	180 75	9200	180 75	9200	180 75
Sterling 5-Chain.	6000	Wis	4 3/4 x 6 1/2	36.1	L	C	Bus	PT	FS	Strm	G	Sim	B-Li	DD	Bos	W	Timk	1/2 Fl	11.60	56.48	Ros	36x6	40x6	23	9200	180 75	9200	180 75	9200	180 75	9200	180 75	9200	180 75
Sterling 5-Chain.	5300	Super Truck 100.	4 3/4 x 6 1/2	36.1	L	C	Bus	PT	FS	Strm	G	Sim	B-Li	DD	Bos	W	Timk	1/2 Fl	11.60	56.48	Ros	36x6	40x6	23	9200	180 75	9200	180 75	9200	180 75	9200	180 75	9200	180 75
Tiffin.	5850	Cont B2	4 3/4 x 6 1/2	36.1	L	C	Bus	PT	FS	Strm	G	Sim	B-Li	DD	Bos	W	Timk	1/2 Fl	11.60	56.48	Ros	36x6	40x6	23	9200	180 75	9200	180 75	9200	180 75	9200	180 75	9200	180 75
Titan 6.	5400	Buda YTU	4 3/4 x 6 1/2	36.1	L	C	Bus	PT	FS	Strm	G	Sim	B-Li	DD	Bos	W	Timk	1/2 Fl	11.60	56.48	Ros	36x6	40x6	23	9200	180 75	9200	180 75	9200	180 75	9200	180 75	9200	180 75
Union City 4-Wheel Drive DA.	5100	Buda YTU	4 3/4 x 6 1/2	36.1	L	C	Bus	PT	FS	Strm	G	Sim	B-Li	DD	Bos	W	Timk	1/2 Fl	11.60	56.48	Ros	36x6	40x6	23	9200	180 75	9200	180 75	9200	180 75	9200	180 75	9200	180 75
United V 6.	5250	Wis JA	4 3/4 x 6 1/2	36.1	L	C	Bus	PT	FS	Strm	G	Sim	B-Li	DD	Bos	W	Timk	1/2 Fl	11.60	56.48	Ros	36x6	40x6	23	9200	180 75	9200	180 75	9200	180 75	9200	180 75	9200	180 75
U. S. T.	5000	Buda ATU	4 3/4 x 6 1/2	36.1	L	C	Bus	PT	FS	Strm	G	Sim	B-Li	DD	Bos	W	Timk	1/2 Fl	11.60	56.48	Ros	36x6	40x6	23	9200	180 75								

ELECTRIC COMMERCIAL CARS

E. C. M.	Name and Model Number	Carrying Capacity	Chassis Weight	Chassis Price	Maximum Speed	Battery	Mileage Per Charge	Motor	Controller	Speeds Forward	Drive	Rear Axle	Springs	Front Tires	Rear Tires	Steering Gear	Wheelbase	Per Cent of Weight on Rear Wheels
	Ward WS 2.....	750	1500	.....	13	Opt	45	G-E	Own	4	W	Shel	Shel	32x3	32x3	Own	88	60
	*C-T BR 1.....	1000	2000	2120	14	Opt	60	G-E	Own	4	C-T	Flot	Shel	36x3½	36x3½	W	89½	60
	Walker M.....	1000	2300	.....	15	Opt	60	G-E	West	5	O	Own	Math	34x3	36x3½	Ross	94	66
	Atlantic 1C.....	2000	2770	.....	12	Opt	.....	G-E	G-E	4	C	Timk	S-El	34x4	36x4	Ross	103	65
	Ward WA.....	1250	2730	.....	12	Opt	45	G-E	G-E	4	W	Shel	Shel	32x3	34x3½	Own	90	60
	C-T BR 2.....	2000	2400	2400	14	Opt	60	G-E	Own	4	C-T	Flot	Shel	36x3½	36x4	W	101	60
	C-T BR 2A.....	1500	2200	2200	14	Opt	60	G-E	Own	4	C-T	Flot	Shel	36x3	36x3½	W	91½	60
	Lansden BG ¾.....	1400	1900	.....	15	Opt	50	G-E	G-E	4	R	Flot	.....	32x4½	32x4½	Lav	90	50
	Lansden MC 1.....	2900	.....	.....	12	Opt	50	G-E	G-E	4	C	Flot	.....	36x3	36x3½	.....	108	60
	Steinmetz.....	1000	1900	.....	16	Opt	55	Own	Own	4	B	Own	.....	33x4½	33x4½*	Ross	110	60
	Walker K.....	2000	2500	.....	14	Opt	60	West	West	5	O	Own	Math	34x3½	36x4	Ross	96	66
	Ward WB.....	2000	3430	.....	10	Opt	40	G-E	G-E	4	W	Shel	Shel	34x3½	36x4	Own	102	60
	Atlantic 2C.....	4000	3590	.....	11	Opt	.....	G-E	G-E	4	C	Timk	S-El	34x4	36x3½	Ross	115	65
	C-T BR 4.....	4000	4000	2800	12	Opt	60	G-E	Own	4	C-T	Flot	Shel	36x4	36x4½	W	116	60
	Lansden MD 2.....	4000	4400	.....	11	Opt	50	G-E	G-E	4	C	Flot	.....	36x4	36x3½	.....	120	60
	Walker L.....	4000	3700	.....	13	Opt	60	West	West	5	O	Own	Math	38x4	38x6	Ross	112	66
	Ward WD.....	4000	4500	.....	8.5	Opt	35	G-E	G-E	4	W	Shel	Shel	36x4	36x7	Own	114	60
	Atlantic 3C.....	7000	5220	.....	10	Opt	.....	G-E	G-E	5	C	Timk	.....	36x5	40x5½	Ross	135	65
	C-T AK 7.....	7000	5800	4200	11	Opt	50	G-E	Own	4	I	Dead	Shel	36x6	36x4½	W	122	55
	Lansden ME ¾.....	5700	.....	.....	10	Opt	45	G-E	G-E	4	C	Flot	.....	36x5	36x4½	.....	133	60
	Ward WF.....	7000	6600	.....	7	Opt	30	G-E	G-E	5	W	Shel	Shel	36x5	36x8	Own	132	70
	Atlantic 5C.....	10000	6230	.....	9	Opt	.....	G-E	G-E	5	C	Timk	S-El	36x6	40x5½	Ross	144	65
	Couple Gear H.....	7000	9000	4750	10	Phil	30	Own	Own	5	B	Own	Tut	36x6	36x8	Own	96	55
	Couple Gear A.....	10000	10000	5250	7	Phil	30	Own	Own	5	B	Own	Tut	36x6	36x8	Own	96	75
	C-T AK 10.....	10000	6500	4400	10	Opt	50	G-E	Own	4	I	Dead	Shel	36x7	36x5½	W	132	55
	Lansden MT 5.....	7500	.....	.....	10	Opt	40	G-E	G-E	4	C	Flot	.....	36x6	36x5½	.....	146	60
	Lansden MG 6.....	8900	.....	.....	7	Opt	35	G-E	G-E	4	R	Flot	.....	36x7	36x6½	.....	156	60
	Walker P.....	7000	5300	.....	11	Opt	50	West	West	5	O	Own	Math	36x5	40x5½	Ross	131	66
	Walker N.....	10000	6300	.....	10	Opt	50	West	West	5	O	Own	Math	36x6	40x6½	Ross	141	66
	Ward WH.....	10000	8375	.....	6	Opt	26	G-E	G-E	5	W	Shel	Shel	36x7	40x10	Own	144	70
	Atlantic 6C.....	13000	6940	.....	8	Opt	.....	G-E	G-E	5	C	Timk	S-El	36x6	40x6	Ross	156	65
	Couple Gear LD.....	14000	11000	5900	10	Phil	30	Own	Own	5	B	Own	Tut	36x6	36x8	Own	96	55

Manufacturers and Models Included in Specifications on Preceding Pages

Acason—¾, 1, 1½, 2½, 3½, 5—Acason Motor Truck Co., Detroit Mich.

Ace—1½, 2½—American Motor Truck Co., Newark, Ohio.

Acme—¾, 1, 1½, 2, 3½, 5—Acme Motor Truck Co., Cadillac, Mich.

Ajax—¾—Ajax Motors Corp., Boston, Mass.

Akron Multi-Truck—1—Thomart Motor Truck Co., Akron, Ohio.

American—2½, 4—American Motor Truck & Tractor Co., Portland, Conn.

Apex—1, 1½, 2½, 3½—Hamilton Motor Co., Grand Haven, Mich.

Armleder—1, 2½, 3½—O. Armleder Co., Cincinnati, Ohio.

Atco—1½, 2½—American Truck & Trailer Corp., Kankakee, Ill.

Atlantic—1, 2, 3, 5, 6—Atlantic Electric Vehicle Co., Newark, N. J.

Atlas—1—Atlas Truck Corp., York, Pa.

Atterbury—1½, 2½, 3½, 5—Atterbury Motor Car Co., Buffalo, N. Y.

Autocar—2, 3½, 5½—Autocar Co., Ardmore, Pa.

Available—1½, 2, 2½, 3½, 5, 7—Available Truck Co., Chicago, Ill.

Avery—1—Avery Company, Peoria, Ill.

Bartlett—7—Bartlett Truck Co., Chicago, Ill.

Beck-Hawkeye—1, 1½, 2, 3—Beck-Hawkeye Motor Truck Works, Cedar Rapids, Iowa.

Bell—1, 1½, 2½—Iowa Motor Truck Co., Ottumwa, Ia.

Belmont—1, 1½, 2, 3½—Belmont Motors Corp., Lewistown, Pa.

Bessemer—1, 1½, 2½, 4—Bessemer Motor Truck Co., Grove City, Pa.

Bethlehem—1, 2, 3, 4—Bethlehem Motor Truck Corp., Allentown, Pa.

Birch—1—Birch Motor Cars, Chicago, Ill.

Bowman—¾—Bowman Motor Car Co., Covington, Ky.

Bridgeport—1½, 2½, 3½—Bridgeport Motor Truck Co., Bridgeport, Conn.

Brinton—2½—Brinton Motor Truck Co., Philadelphia, Pa.

Briscoe—1—Briscoe Motor Corp., Jackson, Mich.

Brockway—¾, 1½, 2½, 3½, 5—Brockway Motor Truck Co., Cortland, N. Y.

C. T.—1, 1½, 2, 3½, 5—Commercial Truck Co., Philadelphia, Pa.

Capitol—1½, 2½, 3½—Capitol Motors Corp., Fall River, Mass.

Case—2—J. I. Case Plow Works Co., Racine, Wis.

Chevrolet—¾, 1—Chevrolet Motor Co. of Mich., Flint, Mich.

Chicago—1½, 2½, 3½, 5—Chicago Motor Truck, Inc., Chicago, Ill.

Climber—1½—Climber Motor Corp., Little Rock, Ark.

Clydesdale—¾, 1, 1½, 2½, 3½, 5—Clydesdale Motor Truck Co., Clyde, Ohio.

Collier—1, 1½, 2, 2½—Collier Motor Truck Co., Bellevue, Ohio.

Columbia—1½, 2½—Columbia Motor Truck & Trailer Co., Pontiac, Mich.

Commerce—1½, 1½, 2—Commerce Motor Car Co., Detroit, Mich.

Concord—1½, 2½—Abbott-Downing Truck & Body Co., Concord, N. H.

Corbitt—1, 1½, 2, 2½, 3½, 5—Corbitt Motor Truck Co., Henderson, N. C.

Couple Gear—¾, 6—Couple Gear Electric Truck Co., Grand Rapids, Mich.

Cyclone—1½—The Cyclone Motor Corp., Greenville, S. C.

Dart—1½, 2½, 3½—Dart Truck & Tractor Corp., Waterloo, Ia.

Day-Elder—1, 1½, 2, 2½, 3½, 5—Day-Elder Motors Corp., Newark, N. J.

Dearborn—1½, 2—Dearborn Truck Co., Chicago, Ill.

Defiance—1, 1½, 2—Defiance Motor Truck Co., Defiance, Ohio.

Denby—1, 1½, 2, 3, 4, 5—Denby Motor Truck Co., Detroit, Mich.

Dependable—1, 1½, 2, 2½, 3½—Dependable Truck & Tractor Co., East St. Louis, Ill.

Diamond T—1½, 1½, 2, 3½, 5—Diamond T Motor Car Co., Chicago, Ill.

Diehl—1, 1½—Diehl Motor Truck Works, Philadelphia, Pa.

Doane—2½, 3½, 6—Doane Motor Truck Co., San Francisco, Cal.

Dodge—¾—Dodge Bros., Detroit, Mich.

D-Olt—1½—D-Olt Motor Truck Co., Inc., Long Island City, N. Y.

Dorris—2, 3½—Dorris Motor Car Co., St. Louis, Mo.

Double Drive—4—Double Drive Truck Co., Chicago, Ill.

Douglas—1½, 2, 3—Douglas Motors Corp., Omaha, Neb.

Duplex—2, 3½—Duplex Truck Co., Lansing, Mich.

Duty—2—Duty Motor Co., Greenville, Ill.

Eagle—2—Eagle Motor Truck Corp., St. Louis, Mo.

Erie—2½—Erie Motor Truck Mfg Co., Erie, Pa.

F. W. D.—3—Four-Wheel Drive Auto Co., Clintonville, Wis.

Facto—2½—Facto Motor Trucks, Springfield, Mass.

Fageol—1½, 2½, 3½, 5—Fageol Motors Co., Oakland, Cal.

Fargo—2—Fargo Motor Truck Co., Chicago, Ill.

Federal—1, 1½, 2, 3½, 5, T.T.—Federal Motor Truck Co., Detroit, Mich.

Ford—1—Ford Motor Co., Highland Park, Mich.

Forschler—1, 1½, 2, 3—Forschler Motor Truck Mfg. Co., New Orleans, La.

Front Drive—1½—Double Drive Truck Co., Chicago, Ill.

Fulton—1, 2, T.T.—Fulton Motors Corp., Farmingdale, N. Y.

G. M. C.—¾, 1, 2, 3½, 5—General Motors Truck Co., Pontiac, Mich.

G. W. W.—1½—Wilson Truck Mfg. Co., Henderson, Ia.

Garford—¾, 1½, 2, 3½, 5, 7½—Garford Motor Truck Co., Lima, O.

Gary—1½, 2½, 3½, 5—Gary Motor Truck Co., Gary, Ind.

Gersix—1½, 2½, 3½—Gersix Mfg. Co., Seattle, Wash.

Giant—1½, 2½, 3½, 5—Giant Truck Corp., Chicago Heights, Ill.

Globe—¾—Globe Motors Co., Cleveland, Ohio.

Gove—2½—Gove Motor Car Co., Detroit, Mich.

Graham—1½—Graham Brothers, Evansville, Ind.

Gramm-Bernstein—1, 1½, 2, 2½, 3, 3½, 5—Gramm-Bernstein Motor Truck Co., Lima, Ohio.

Hahn—1, 1½, 2, 2½, 3½, 5—Hahn Motor Truck & Wagon Co., Ham-
leas, Pa.

Hal-Fur—2, 3½—Hal-Fur Motor Truck Co., Cleveland, Ohio.

Hall—2½, 3½, 5, 7—Lewis-Hall Motors Corp., Detroit, Mich.

Harvey—1½, 2½, 3½, 5—Harvey Motor Truck Co., Harvey, Ill.

Hawkeye—1½, 2, 3½—Hawkeye Truck Co., Sioux City, Ia.

Hendrickson—2½, 3½, 5—Hendrickson Motor Truck Co., Chicago, Ill.

Highway-Knight—4, 5—Highway Truck Corp., Chicago, Ill.

Higrade—1, 1½—Higrade Motors Co., Harbor Springs, Mich.

Holmes—2—Holmes Motors Mfg. Co., Littleton, Colo.

H. R. L.—¾, 1½, 2½—H. R. L. Motor Co., Seattle, Wash.

Huffman—1½—Huffman Bros. Co., Elkhart, Ind.

Hurlburt—1½, 2½, 3½, 5—Harrisburg Mfg. & Boiler Co., Harris-
burg, Pa.

Huron—1½, 2½—Huron Truck Co., Bad Axe, Mich.

Independent—1½, 2½, 3½—Independent Motor Co., Youngstown, Ohio.

Independent—1½, 2½—Independent Motor Truck Co., Inc., Daven-
port, Ia.

Indiana—1½, 2, 2½, 3½, 5—Indiana Truck Corp., Marion, Ind.

International—1, 1½, 2, 3, 5—International Harvester Co., Chicago, Ill.

Italia—2, 3, 5—Italia Motor Truck Co., San Francisco, Cal.

Jackson—3½—Jackson Motors Corp., Jackson, Mich.

J & J—2—The Lorain Motor Truck Co., Lorain, Ohio.

Jumbo—1½, 2, 2½, 3, 3½, 4—Nelson Motor Truck Co., Saginaw, Mich.

Kalamazoo—1½, 2½, 3½—Kalamazoo Motor Corp., Kalamazoo, Mich.

Kankakee—2½—Kankakee Automobile Co., Kankakee, Ill.

Karavan—2½—Caravan Motors Co., Portland, Ore.

Kearns—¾, 1½—Kearns-Dughe Motors Co., Danville, Pa.

Kelly-Springfield—1½, 2½, 3½, 5, 6—Hare's Motors, Inc., New York, N. Y.

Keystone—2—Keystone Motor Truck Corp., Philadelphia, Pa.

Kimball—2, 2½, 3, 4, 5—Kimball Motor Truck Co., Los Angeles, Cal.

King Zeitler—2, 4—King Zeitler Co., Chicago, Ill.

Kissel—1, 1½, 2½, 4, 5—Kissel Motor Car Co., Hartford, Wis.

Kleiber—1, 1½, 2, 2½, 3½, 5—Kleiber & Co., Inc., San Francisco, Cal.

- Koehler—1½, 2½, 3½, T.T.—H. J. Koehler Motors Corp., Bloomfield, N. J.
 Lange—2—Lange Motor Truck Co., Pittsburgh, Pa.
 Lansden—¾, 1, 2, 3½, 5, 6—Lansden Company, Danbury, Conn.
 Larrabee-Deyo—1½, 2½, 3½, 5—Larrabee-Deyo Motor Truck Co., Inc., Binghamton, N. Y.
 L. M. C.—2½—Louisiana Motor Car Co., Shreveport, La.
 Lombard—T.T.—Lombard Auto Tractor Truck Corp., New York, N. Y.
 Luedinghaus—1, 1½, 2—Luedinghaus-Espenschied Wagon Co., St. Louis, Mo.
 Luverne—2, 3—Luverne Automobile Co., Luverne, Minn.
 Maccar—1½, 2½, 3½, 6—Maccar Truck Co., Scranton, Pa.
 MacDonald—7—MacDonald Truck & Tractor Co., San Francisco, Cal.
 Mack—1½, 2, 2½, 3½, 5, 6½, 7½, T.T.—International Motor Co., New York, N. Y.
 Master—1½, 2½, 3½, 5, T.T.—Master Trucks, Inc., Chicago, Ill.
 Maxwell—1½—Maxwell Motor Co., Inc., Detroit, Mich.
 Menominee—1, 1½, 2, 3½, 5—Menominee Motor Truck Co., Menominee, Mich.
 Moline—1½—Moline Plow Co., Moline, Ill.
 Moreland—1½, 2½, 4, 5—Moreland Motor Truck Co., Los Angeles, Cal.
 Mutual—2, 2½—Mutual Truck Co., Sullivan, Ind.
 Napoleon—¾, 1, 1½—Napoleon Motors Co., Traverse City, Mich.
 Nash—1, 2—Nash Motors Co., Kenosha, Wis.
 Nelson-LeMoon—1, 1½, 2½, 3½, 5—Nelson & LeMoon, Chicago, Ill.
 Netco—2, 2½—New England Truck Co., Fitchburg, Mass.
 Niles—2—Niles Motor Truck Co., Pittsburgh, Pa.
 Noble—1½, 2, 2½, 3½—Noble Motor Truck Co., Kendallville, Ind.
 Northway—2, 3½—Northway Motors Co., Natick, Mass.
 Norwalk—1, 1½—Norwalk Motor Car Co., Martinburg, W. Va.
 O. K.—1½, 2½, 3½—Oklahoma Auto Mfg. Co., North Muskogee, Okla.
 Ogden—1½, 2½, 3½, 5—Ogden Motor Truck Co., Chicago, Ill.
 Old Hickory—1—Kentucky Wagon Mfg. Co., Louisville, Ky.
 Old Reliable—1½, 2½, 3½, 5, 6—Old Reliable Motor Truck Co., Chicago, Ill.
 Oldsmobile—1—Olds Motor Works, Lansing, Mich.
 Olympic—2½—Olympic Motor Truck Co., Tacoma, Wash.
 Oneida—1½, 1½, 2½, 3½, 5—Oneida Motor Truck Co., Green Bay, Wis.
 Orleans—1½, 2½, 3½—New Orleans Motor Truck Mfg. Co., New Orleans, La.
 Oshkosh—2—Oshkosh Motor Truck Mfg. Co., Oshkosh, Wis.
 Packard—2, 3, 5—Packard Motor Car Co., Detroit, Mich.
 Paige—1½, 2½, 3½—Paige-Detroit Motor Car Co., Detroit, Mich.
 Parker—2, 3½, 5—Parker Motor Truck Co., Milwaukee, Wis.
 Patriot—1, 2, 3—Patriot Motors Co., Lincoln, Neb.
 Penn—2—Penn Motor Corp., Philadelphia, Pa.
 Pierce-Arrow—2, 3½, 5—Pierce-Arrow Motor Car Co., Buffalo, N. Y.
 Pioneer—1—Pioneer Truck Co., Chicago, Ill.
 Pittsburgher—2½—Pittsburgh Truck Mfg. Co., Pittsburgh, Pa.
 Power—1½, 3½—Power Truck & Tractor Co., Detroit, Mich.
 Premocar—1½—Preston Motors Corp., Birmingham, Ala.
 Rainier—¾, 1, 1½, 2, 2½, 3½, 5—Rainier Motor Corp., Flushing, L. I., N. Y.
 Ranger—2—Southern Motor Mfg. Ass'n, Ltd., Houston, Tex.
 Reliance—1½, 2½—Reliance Motor Truck Co., Appleton, Wis.
 Reo—¾—Reo Motor Car Co., Lansing, Mich.
 Republic—¾, 1, 1½, 2½, 3½—Republic Motor Truck Co., Inc., Alma, Mich.
 Reynolds—1½, 2½, 3½, 5—Reynolds Motor Truck Co., Mt. Clemens, Mich.
 Riker—3, 4—Locomobile Co. of America, Bridgeport, Conn.
 Rowe—1½, 2, 3, 4, 5—Rowe Motor Mfg. Co., Lancaster, Pa.
 Rumely—1½—Advance-Rumely Thresher Co., Inc., La Porte, Ind.
 Samson—¾, 1½—Samson Tractor Co., Janesville, Wis.
 Sandow—1, 1½, 2, 2½, 3½, 5—Sandow Motor Truck Co., Chicago, Ill.
 Sanford—2½, 3½, 5—Sanford Motor Truck Co., Syracuse, N. Y.
 Schacht—2, 2½, 3½, 5—G. A. Schacht Motor Truck Co., Cincinnati, Ohio.
 Schwartz—1, 1½, 2½, 4—Schwartz Motor Truck Co., Reading, Pa.
 Seiden—1½, 2½, 3½, 5—Seiden Truck Corp., Rochester, N. Y.
 Seneca—¾—Seneca Motor Car Co., Fostoria, Ohio.
 Service—¾, 1, 1½, 2½, 3½, 5—Service Motor Truck Co., Wabash, Ind.
 Signal—1, 1½, 2½, 3½, 5—Signal Motor Truck Co., Detroit, Mich.
 Southern—1, 1½, 2—Southern Truck & Car Corp., Greenboro, N. C.
 Standard—1, 2½, 3½, 5—Standard Motor Truck Co., Detroit, Mich.
 Steinmetz—¾—Steinmetz Electric Motor Car Corp., Baltimore, Md.
 Sterling—1½, 2, 2½, 3½, 5, 7½—Sterling Motor Truck Co., Milwaukee, Wis.
 Stewart—¾, 1, 1½, 2, 2½, 3½—Stewart Motor Corp., Buffalo, N. Y.
 Stoughton—1, 1½, 2, 3—Stoughton Wagon Co., Stoughton, Wis.
 Success—2½—Webberville Truck Co., Webberville, Mich.
 Super Truck—2½, 3½, 5—O'Connell Motor Truck Co., Waukegan, Ill.
 Superior—1, 2—Superior Motor Truck Co., Atlanta, Ga.
 Tiffin—1½, 2½, 3½, 5, 6—Tiffin Wagon Co., Tiffin, Ohio.
 Titan—2½, 3½, 5—Titan Truck Co., Milwaukee, Wis.
 Tower—1½, 2½, 3½—Tower Motor Truck Co., Greenville, Mich.
 Trabold—2½—The Trabold Company, Johnstown, Pa.
 Traffic—2—Traffic Motor Truck Corp., St. Louis, Mo.
 Transport—1, 1½, 2½, 3½—Transport Truck Co., Mt. Pleasant, Mich.
 Traylor—1½, 2, 3, 4, 5—Traylor Eng. & Mfg. Co., Cornwells, Pa.
 Triangle—¾, 1½, 2, 2½—Triangle Motor Truck Co., St. Johns, Mich.
 Triumph—2, 2½—Triumph Truck & Tractor Co., Kansas City, Mo.
 Twin City—F. W. D., 3½, 5—Twin City Four-Wheel Drive Co., Inc., St. Paul, Minn.
 Twin City—2, 3½—Minneapolis Steel & Mach. Co., Minneapolis, Minn.
 Ultimate—1½, 2, 2½, 3—Vreeland Motor Co., Inc., Newark, N. J.
 Union—2½, 4, 6—Union Motor Truck Co., Bay City, Mich.
 United—1½, 2½, 3½, 5—United Motors Co., Grand Rapids, Mich.
 Ursus—1, 1½, 2½—Ursus Motor Co., Inc., Chicago, Ill.
 U. S.—1½, 3, 4, 5—United States Motor Truck Co., Cincinnati, Ohio.
 Velle—1½—Velle Motors Corp., Moline, Ill.
 Vim—¾, 1, 2, 3—Vim Motor Truck Co., Philadelphia, Pa.
 Vulcan—2½—Vulcan Mfg. Co., Seattle, Wash.
 Walker—1½, 1, 2, 3½, 5—Walker Vehicle Co., Chicago, Ill.
 Walker-Johnson—2½—Walker-Johnson Truck Co., Woburn, Mass.
 Walter—5—Walter Motor Truck Co., New York, N. Y.
 Ward—¾, 1, 2, 3½, 5—Ward Motor Vehicle Co., Mt. Vernon, N. Y.
 Ward La France—2½, 3½, 5—Ward La France Truck Co., Inc., Elmira, N. Y.
 Watson—¾, 3½, T.T.—Watson Wagon Co., Canastota, N. Y.
 White—¾, 2, 3½, 5—White Co., Cleveland, Ohio.
 White Hickory—1, 1½, 2½—White Hickory Motor Corp., Atlanta, Ga.
 Wichita—1, 1½, 2, 2½, 3, 3½, 5½—Wichita Falls Motors Co., Wichita Falls, Tex.
 Wilcox—1, 1½, 2½, 3½, 5—H. E. Wilcox Motor Co., Minneapolis, Minn.
 Wilson—1½, 2½, 3½, 5—J. C. Wilson Co., Detroit, Mich.
 Winther—1, 1½, 2, 2½, 3½, 5, 6—Winther Motor Truck Co., Kenosha, Wis.
 Witt-Will—1½, 2—Witt-Will Co., Inc., Washington, D. C.
 Wolverine—1, 1½, 2, 2½, 3½—American Commercial Car Co., Detroit, Mich.
 Yellow Cab—¾, 1—Yellow Cab Mfg. Co., Chicago, Ill.
 Young—1, 2, 3½—The Young Motor Truck Co., Euclid, Ohio.



Trucks Notable Success in Ice Cream and Ice Hauling

Controversies based on the arguments of frequency of stops and starts and the need of special equipment for hauling in the ice cream and ice industries are today things of the past. One of the most illuminating examples of changed conditions is evidenced in the fleet of Transport trucks in the service of the Consumers Ice & Creamery Co., Detroit, Mich. It is a success that may well be observed for the progress that has been made in equipment, as well as in the extension of trade radius, and saving in time and money. Records show that each truck makes an average daily run of fifty miles.



Truck Serves as a Temporary Pump Motor

The Moon Lake Ice Co., Grand Rapids, Mich., in completing the erection of a new building, came face to face with a problem. In order to determine whether a well that had been sunk at one end of the building would produce sufficient water for the needs of the new ice plant, it was decided to test its capacity. In order to obviate the necessity of installing a special pump for the test, one of the 3½ ton trucks of the Acme fleet was utilized for the purpose. The rear end of the truck was raised on blocking, belt attached to the pump from the rear wheel, and the 45 hp. truck engine served as a satisfactory substitute. The well was found satisfactory.

Taken From Current House Organs

Can a Stranger Correctly Read Your Signature?

Every day we receive letters signed by men whose names we cannot decipher from their signatures.

The only possible reason, or excuse, a man can have for camouflaging his signature, is the question of protection. He has an idea that the more flourishes he works in, the more difficult it will be to counterfeit.

We are not writing or signature experts, but our notion is, he is wrong about it. In any event, we would rather have our signature counterfeited and thereby lose a few million dollars occasionally, than to be responsible for the nervous prostration of every man who receives a letter from us and who then goes bughouse trying to find out who wrote it.—*Four Runner*, Kalamazoo Motors Corp., Kalamazoo, Mich.

Find and Sort for Yourself

We were talking with a florist. He had been engaged in the business of growing plants, flowers and shrubs, for a good many years and had been very successful, hence we listened.

He said it was rare to find any two of the things he raised which required the same kind of treatment. He said some plants required lots of water and some very little; some thrived on rich soil while others would become sickly and die unless given plenty of sand—and so with men.

As business men you want above everything else to be successful and you do not have to be argued with to know that unless you feel fit mentally and physically your business is going to suffer.

All right, so much for so much. You are fortunate in finding a physician or physical culture gentleman possessing good horse sense and you pay him for his advice as to how you may keep well. You follow his advice for a few days, or if you have a lot of sticktoitiveness, possibly for a few weeks and then what happens?

Well, you have been through the mill and you know what happens without our telling you. You claim you are too busy, when as a matter of fact you are too lazy and you, of course, give it up.

We are speaking by the book now, because we have done exactly the same thing and any names we call you we call ourself—or at least we once could, but not now.

What you will have to do, Mr. Man, is to find and sort for yourself. You ought to know more about yourself and your needs than the best physician on earth. You live with yourself all the time, you have a lot of quirks he knows nothing about and so we say, if you neglect your-

self until you get sick, employ a doctor or not, that is up to you, but in order to keep well, **find and sort for yourself.**

Some men can get along on four hours' sleep a night; some require eight. Some men thrive on meat while to others it is a poison. Some men can smoke without injury, some cannot, but there is no man on earth who can keep well physically and mentally unless he **EXERCISES JUDICIOUSLY AND ALSO THINKS PLEASANTLY.**—*Four Runner*, Kalamazoo Motors Corp., Kalamazoo, Mich.

Time's Good for Good Times

From all sections of the country comes one incessant yearning: "When is business going to take up?" It is on the mind of everyone; it concerns everyone. But business won't take up; it will be made up. Industries will not be built until they be planned and designed; and the people are the architects.

It is illogical to believe that there is lack of buyers in this country knowing that people are not selling their Liberty Bonds. It is inconceivable to reason that there is no demand for industries when we think of six years material deterioration and remunerative depreciation, or that business will not resume its normal pace. Merchandisers are not confronted with an inability to purchase, but a curtailment of desires and economy in paying on the part of buyers—these are the barriers that must be surmounted if goods be sold.

Now that German reparation is in development of liquidation, business men will become more receptive and retarding obstacles will melt gradually before economic rejuvenescence until international political strife be permanently adjusted.

At this time of writing there is more appearance of stabilization of sentiment or "feeling-tone" than for many months. Business improvement has been marked in "spots," and decidedly substantial where deflation has been pronounced and took place early.

Registration on the "ticker-tape" are the best barometers of economic conditions and forecasts; and as stabilization exists in the stock markets there is proof

that the worst has been experienced respecting financial stringencies.

It has been written: "When someone stops buying someone stops selling. When someone stops selling, someone stops making. When someone stops making, someone stops earning. When someone stops earning he has to stop buying." Yet, the sun is always bright after the storm; and likewise business will revive and cast its rays into the diversified markets of the world.

But business moves only when it is hauled, and in our haste to overtake the past we must exercise exacting efficiency in all transportation, the basic principle of national and international commerce. As the recollection of quality remains long after the price is forgotten, so will reflections of our deflation experiences abide with us and strengthen us through future years.—*Haul-Age*, Garford Motor Truck Co., Lima, O.

Hypnotizing by Mystification

During the course of his sales talk recently, a salesman took a small leather-covered box from his coat pocket and laid it on the desk before him, his hand gently resting on it. The customer noticed the action. The salesman continued his remarks without referring to, or even glancing at, the case. After a short time, the salesman put it back into his pocket without a word.

Upon leaving, after the order was signed, some one in the office who had watched the transaction asked the object of putting the box down that way, and what it contained.

"There is nothing in it," said the salesman. "But when a situation becomes tense, I find that drawing the customer's mind away from the subject to something that excites curiosity, helps. No, very few customers ask about the box, and that is really strange. While I have my hand covering the box, I keep talking about Milwaukee outfits, as if there was nothing else of any interest. Some way, this has proven of assistance in many instances. It is just a little idea of my own, but I don't know whether it could be worked by others.—*Tank News*, Milwaukee Works, Milwaukee, Wis.

Business Today is of Particular News Interest.

This part delivery of six Selden trucks by T. P. Fitzgerald, distributor at Ashtabula, Ohio, is an indication that somebody is on the job despite pessimistic rumors of slow business. This fleet consists of 2½ and 3½ ton models equipped with dump bodies, and are to be employed in road-building service.



Oldfield Tire Co., Akron, O.	25.75	47.45	50.20	53.65	56.05	66.85	70.15	120.90	2200	90	171.20	3000	100	220.60	4000	110	251.90	5000	120	352.10	6000	130
Oldfield Cord, anti-skid	25.75	47.45	50.20	53.65	56.05	66.85	70.15	120.90	2200	90	171.20	3000	100	220.60	4000	110	251.90	5000	120	352.10	6000	130
Pennsylvania Rubber Co., Jeannette, Pa.	29.65	41.85	44.25	47.35	49.65	58.95	61.90	85.55	2200	90	125.95	3000	100	159.95	4000	110	205.20	5000	120	251.90	6000	130
Vacuum Cup Cord	24.70	46.30	48.95	52.35	54.90	65.20	68.45	113.10	2200	90	159.90	3000	100	205.20	4000	110	251.90	5000	120	352.10	6000	130
Perfection Tire & Rubber Co., Fort Madison, Ia.	24.90	41.85	44.25	47.30	49.65	58.90	61.90	102.65	2200	90	140.00	3000	100	186.00	4000	110	251.90	5000	120	352.10	6000	130
Pharis Tire & Rubber Co., Newark, O.	29.50	46.00	48.50	52.00	54.50	64.00	67.50	102.65	2200	90	140.00	3000	100	186.00	4000	110	251.90	5000	120	352.10	6000	130
Quaker City Rubber Co., Philadelphia, Pa.	26.50	46.30	48.95	52.35	54.90	65.20	68.45	102.65	2200	90	140.00	3000	100	186.00	4000	110	251.90	5000	120	352.10	6000	130
T. T. L. Cord	25.70	46.30	48.95	52.35	54.90	65.20	68.45	102.65	2200	90	140.00	3000	100	186.00	4000	110	251.90	5000	120	352.10	6000	130
Racine Auto Tire Co., Racine, Wis.	34.70	52.30	55.30	59.15	62.05	73.65	77.35	119.35	2200	90	168.80	3000	100	217.45	4000	110	251.90	5000	120	352.10	6000	130
Racine Rubber Co., Racine, Wis.	25.90	43.50	46.00	49.20	51.60	61.25	64.35	95.50	2200	90	135.00	3000	100	186.00	4000	110	251.90	5000	120	352.10	6000	130
Republic Rubber Co., Youngstown, O.	28.00	46.20	49.00	53.00	55.00	65.50	68.50	108.00	2200	90	143.00	3000	100	186.00	4000	110	251.90	5000	120	352.10	6000	130
Republic Rubber Co., Youngstown, O.	24.50	46.60	49.30	52.70	55.25	65.60	68.85	114.80	2200	90	162.40	3000	100	201.15	4000	110	251.90	5000	120	352.10	6000	130
Standard Tire Co., Wilmoughby, O.	36.95	61.90	64.05	68.30	72.00	85.30	89.50	114.80	2200	90	162.40	3000	100	201.15	4000	110	251.90	5000	120	352.10	6000	130
Tiger Foot, non-skid	28.00	46.20	49.00	53.00	55.00	65.50	68.50	108.00	2200	90	143.00	3000	100	186.00	4000	110	251.90	5000	120	352.10	6000	130
Star Rubber Co., Akron, O.	24.50	46.60	49.30	52.70	55.25	65.60	68.85	114.80	2200	90	162.40	3000	100	201.15	4000	110	251.90	5000	120	352.10	6000	130
Star Cord, All Star	36.95	61.90	64.05	68.30	72.00	85.30	89.50	114.80	2200	90	162.40	3000	100	201.15	4000	110	251.90	5000	120	352.10	6000	130
Swinehart Tire & Rubber Co., Akron, O.	24.50	46.60	49.30	52.70	55.25	65.60	68.85	114.80	2200	90	162.40	3000	100	201.15	4000	110	251.90	5000	120	352.10	6000	130
Swinehart Cord, Hexagon	36.95	61.90	64.05	68.30	72.00	85.30	89.50	114.80	2200	90	162.40	3000	100	201.15	4000	110	251.90	5000	120	352.10	6000	130
Syracuse Rubber Co., Inc., Syracuse, N. Y.	24.50	46.60	49.30	52.70	55.25	65.60	68.85	114.80	2200	90	162.40	3000	100	201.15	4000	110	251.90	5000	120	352.10	6000	130
Syria-Cord, non-skid	36.95	61.90	64.05	68.30	72.00	85.30	89.50	114.80	2200	90	162.40	3000	100	201.15	4000	110	251.90	5000	120	352.10	6000	130
Tyrer Rubber Co., Andover, Mass.	24.50	46.60	49.30	52.70	55.25	65.60	68.85	114.80	2200	90	162.40	3000	100	201.15	4000	110	251.90	5000	120	352.10	6000	130
Tyrian Cord, non-skid	36.95	61.90	64.05	68.30	72.00	85.30	89.50	114.80	2200	90	162.40	3000	100	201.15	4000	110	251.90	5000	120	352.10	6000	130
United States Tire Co., New York, N. Y.	24.50	46.60	49.30	52.70	55.25	65.60	68.85	114.80	2200	90	162.40	3000	100	201.15	4000	110	251.90	5000	120	352.10	6000	130
U. S. Nobby Cord, non-skid	24.50	46.60	49.30	52.70	55.25	65.60	68.85	114.80	2200	90	162.40	3000	100	201.15	4000	110	251.90	5000	120	352.10	6000	130

Reclaimed Oil is Urged by Chemical Society

Automobile owners were recently urged not to waste motor oils, but to have them reclaimed by William F. Parish of Chicago, before the petroleum section of the American Chemical Society.

"The dilution of motor oils," said Mr. Parish, "is bringing about increased consumption per mile of both motor oils and fuel. Motors are drained more frequently under the conditions existing with the present day comparatively heavy fuel. The loss of fuel can be easily figured when it is considered that the average used oil drained from motors will contain about 15 per cent of fuel in summer and 30 per cent in the winter. This fuel is not the same as the original gasoline that is used in the motor, as it consists of an accumulation of the heavy ends.

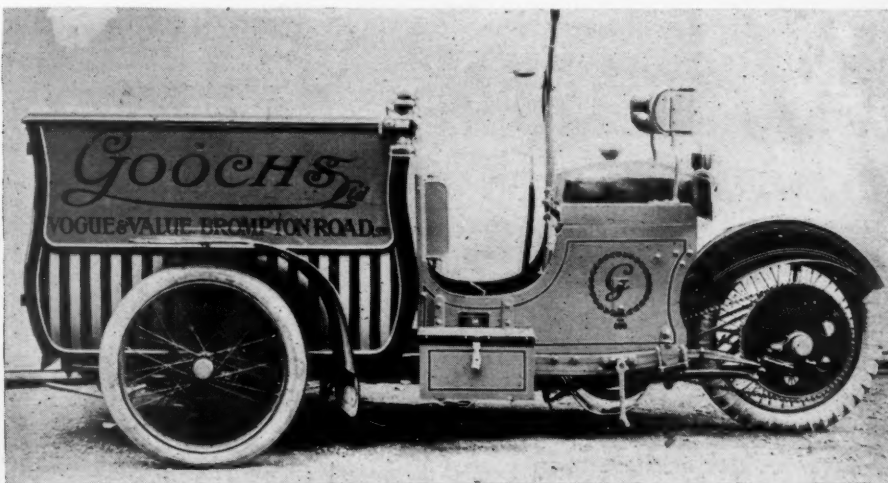
"The increased consumption of motor oil per car or truck during the coming year will be due to a better and more

general understanding of the dilution problem and to an attempt to remedy it by removing the oil more often. The fact that there are now appearing on the market in many forms instruments for the detection of dilution seems to indicate a more comprehensive understanding of the condition and there will follow attempts by the motoring public to remedy the condition, which will manifest itself in the greater use of new oil. This greater consumption of oil can probably be met by the oil industry this year without greatly overburdening the refineries, but if unchecked in the years to come the increased consumption of oil per car will place an unnecessary burden on both the refiner and the motorist. We are not justified in wasting millions of gallons of used motor oil every year, especially as there is reason to believe that the oil contained in the mixture that is thrown away as worthless has greater intrinsic value, gallon for gallon, than the original oil.



Lumbering Business Demands Heavy-Duty Service

This illustration shows one of the loads typical of those carried by a Twin City 3½ ton in the service of the Sterling Lumber Co., Sterling, Colo. The owner of this particular job expresses satisfaction in the performance of a motor truck in the lumbering business. This job had been in service for the last year and has caused but little expense for upkeep, although the truck consistently carries capacity loads.



This Smart Little Three-Wheeled Warrick Carrier Represents a Handy Type of Commercial Car That is Considerably in Use in Europe Especially for Retail Deliveries From Large Stores

TRUCK EQUIPMENT AND APPLIANCES



Meyer's Chain Connector

Meyer's lightning chain connector offered by the Henry T. C. Meyer Co., Detroit, Mich., is a tool for holding a heavy truck chain while a repair link is slipped into place. It can be operated by one man, permits the use of both hands for attention to the replacement, eliminates the need of a jack, requires no adjustments, and can be used with equal success on any machinery employing a chain.

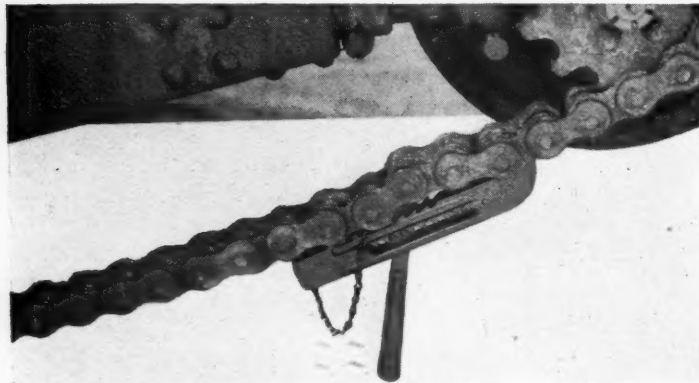
This tool has been carefully tested by the U. S. Department Quartermaster and is now being used in shop and truck companies as a serviceable and satisfactory addition to their equipments.

This device is said to have become an indispensable part of a truck driver's equipment, if once the driver has accus-

operator entire control over the tool at all times, making it unnecessary to shift either hand to start or stop it.

While this product is essentially a portable electric grinder it is supplied complete with quick detachable base and adjustable tool rest so it can be used with equal facility as a bench grinder. Besides the base the equipment also includes two 5 in. x 1 in. grinding wheels, one fine and one coarse, a wire brush wheel, a rag buffing wheel.

Mechanically this grinder has several new features. It has grease lubrication throughout, forced air cooling, chrome nickel steel gears and shafts and aluminum alloy housing. The entire mechanism is protected from dust and other foreign matter.



Meyer's Chain Connector

Holds heavy truck chains and permits use of both hands.

tomed himself to its use in making repairs while on the road. In case the chain breaks the driver can pull it together with this tool, repair the chain in a short time and be on the way again.

The strength of this tool has been tested at 500 lb. It weighs 3½ lb. and is made of malleable iron. It can be had for any size chain and lists from \$3 to \$4 each.

Operation is simple. The following are directions:

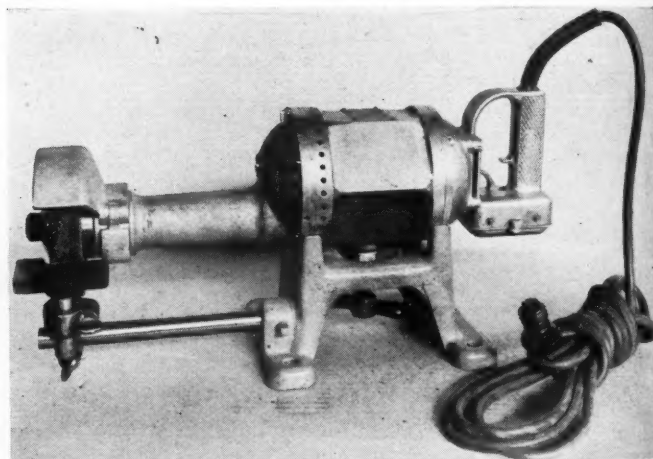
Put handle in last hole, then put pin in hole of hook. Hook tool behind first link and lay other end of chain on the other hook. Then work handle forward and back until the links meet for the master link; have lever in position, as shown in the illustration. To release pull back a fraction on lever to relieve tension on pin, pull pin out and tool is free.

Black & Decker New Portable Electric Grinder

The Black & Decker Mfg. Co. announces that it has perfected a portable electric grinder embodying all the features of its portable electric drill. The new grinder has the familiar pistol grip and trigger switch control which gives the

Black & Decker New Portable Electric Grinder

It embodies all the features of the company's portable electric drill.



Owing to its design and the use of the finest materials only, this grinder is exceptionally light. These grinders can be operated on either direct or alternating current at will.

Specifications

H.P.	Speed No Load	Wheel Size	Dia. of Wheel Arbor	Net Weight without Base
1/2	3200 r.p.m.	5 x 1 in.	3/4 in.	21 lbs.

Body Maker Reduces

The Martin-Parry Corporation, commercial body manufacturers, who operate plants in York, Pa., and Indianapolis, Ind., have announced another substantial reduction in prices of their bodies for Fords. This reduction amounts to as much as 10 per cent on certain models.

Empress High-Pressure Lubricating System

The Empress high pressure lubricating system provides a practical and effective system of chassis lubrication which satisfactorily meets all requirements. The manufacturers, the Bowen Products Corp., Auburn, N. Y., state sturdy construction, mechanical perfection and practical design permits of a positive, quick, easy and clean method of lubricating any truck or car.

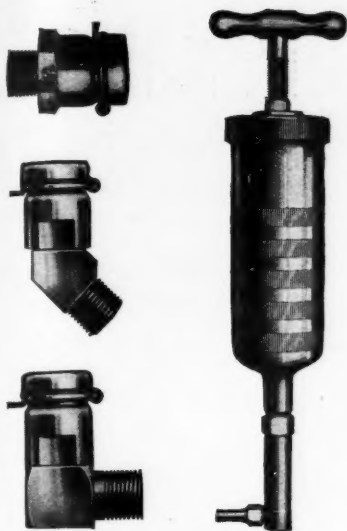
Its collective features are as follows: One hand operates it; effectively handles all grades of grease or oil; pressure or gravity system; convenient to handle, easy to operate; cleans and lubricates; and with it an entire chassis can be lubricated with dispatch.

The one hand operating feature of the Empress system is a point that is appreciated when lubricating the inaccessible bearings. Pressure as high as required is developed in the gun before applying the gun to the connection installed on the bearing; then as the gun nozzle is thrust into the connection the pressure is re-

leased and the resulting explosive action instantly flushes the bearings with a charge of the lubricant forced in under high pressure.

The explosive action by which the lubricant is forced into the bearing effectively cleans it. All dead grease and dirt which may have accumulated is driven out, leaving instead bearings covered with a film of fresh lubricant.

When grease is used as a lubricant it is always forced into the bearings under pressure, and the gun is conveniently carried in the tool box. If oil is used as a lubricant the gun is not carried in the tool box, the connections being filled from an ordinary oil can as lubrication is required. Feeding by gravity, the gun being used as the occasion demands for flushing and cleaning out the bearings un-



Empress High-Pressure System
Showing lubricator and three elbows

der high pressure. Kerosene is effective for this purpose. When not in use the gun is left hanging in the garage.

The Empress high pressure lubricating system consists of one gun and three different types of dustproof connections. These connections are made up as follows: Straight connection, 45-degree elbow connection and 90-degree elbow connection. The elbow connections are made for greater convenience in applying the gun to the bearings, which would be almost inaccessible with the straight connections. All three connections are furnished in a number of different threads to fit any make truck or car. Adapters are also furnished where necessary to use the connections on spring bolt head and other similar places. For places where the lubricant is apt to throw out, due to centrifugal force, the connections are fitted with a ball-check valve. These ball-check valve connections are also made for use on water pump.

The connections are made with a revolving cap for convenience in lubricating, making it possible to operate from any position. These caps are fastened to the connection and are easily snapped open and closed with the end of the Empress gun without danger of mutilation. They cannot be lost and eliminates the necessity of cleaning the fittings each time the lubricant is applied.



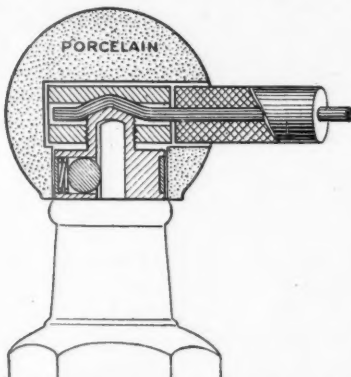
Attached for Application

Wiederholdt Terminals

The construction of the Wiederholdt terminals is such as to completely insulate all electrical connections at spark plugs. As may be seen from the accompanying illustration, the terminal wire is thoroughly insulated within a porcelain ball.

Spark plug wires equipped with these terminals can be taken off or put back on the spark plug with the bare hands while the engine is running.

Besides the feature of insulation it is featured by the fact that the terminal can be easily taken off or put on a plug, and



A Cross-Section of the Wiederholdt Terminal
Completely insulated and easily attached or detached

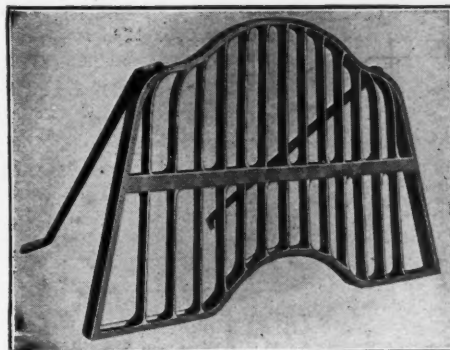
when once attached it cannot work loose. Instead of being screwed on it is snapped on.

These terminals offered by the Wiederholdt Terminal Co., St. Louis, Mo., can be attached in a few minutes time with just an ordinary pocket knife and a screw driver.

"All-Weld" Steel Radiator Guards

Michaels & Murre, Inc., welding engineers, 344 Amsterdam Ave., New York City, manufacture a radiator guard, known as the "All-Weld" radiator guard, which is made practically of one piece, as all the joints are welded. Because of this construction it is claimed to possess the flexibility of a forging and reduce vibration to a minimum. This guard is obtainable in sizes and styles to conform to the requirements of any make truck on the market. The construction avoids the cumbersome and provides 92 per cent opening for proper air circulation.

The All-Weld guard consists of three main units, the guard itself, and two side braces, bolted to the guard and side members of the frame. The frame of the guard is of 2-in. channel. A series of vertical flat steel bars, $\frac{1}{4}$ in. to $\frac{3}{8}$ in. thick and $1\frac{3}{4}$ in. wide, spaced so as to give maximum protection without interfering with air circulation, are enclosed in the frame. The bars are welded integral with the frame at the top and bottom and front and back. A steel flat bar is also welded horizontally across the guard, midway between the top and bottom, both at the front and back of guard, at both ends of the bar to the side of the frame and to each vertical bar.



"All-Weld" Steel Radiator Guard

Every part is thoroughly welded, making it practically an integral unit

This construction is said to be such as to enable the guard to resist not only straight blows, but blows from other angles as well. The fact that the vertical bars are set inside of the frame is said to insure the stress of a blow, being taken up largely by the lip of the channel frame, with the added strength of a welded joint at this point. The horizontally welded bar, it is pointed out, will completely resist an oblique blow.

Attachment of the guard is conventional, being made either by angle, round or flat steel side braces.

Another important feature of this guard is the fact in case of an extraordinarily heavy blow the bars will not tear apart and puncture the radiator core, but will bend and remain one piece, causing the shock to be transmitted through the side braces to the frame of the truck.

McQuay-Norris Offers New Piston Ring

The McQuay-Norris Mfg. Co., St. Louis, Mo., has made an addition to its line of piston rings. Manufactured for a low price market this new ring is to be known as the Jiffy-Grip. The retail price of this ring is to be \$.50 excepting in the far west and Canada.

It is a one-piece, concentric ring of electric iron, with a velvet finish that is said to enable it to set quickly, and with an improved joint that is claimed not to "butt."

Jiffy-Grip piston rings are packed in individual glassine envelopes, twelve rings to a package. These rings are made in standard sizes and oversizes up to 5 in. in diam.; oversize service from stock in 5, 10, 15, 20, 25 and 31 thousandths.



McQuay-Norris New Ring

Goodyear "All-Weather" Tread Solid Tire

The Goodyear Tire & Rubber Co., Akron, O., has just developed a new solid tire for motor trucks, the unique feature of which is the adaptation of the Goodyear "All-weather," or non-skid, tread similar to that used on all pneumatic automobile and truck tires. Adaptation of this tread is claimed to afford more traction for heavy and slow moving trucks.

The side walls of the new tire are built on an angle to prevent undercutting of the tread and, it is pointed out, the additional height afforded by the new tread



Goodyear "All-Weather" or Non-Skid Solid Truck Tire

provides an oversize factor for cushioning both the truck and the load.

The tread solid tire just developed has from 20 to 35 per cent thicker tread than the ordinary solid tire. It provides a happy medium between the old solid truck tire and the pneumatic truck tire, having the durability of the solid tire and the cushioning advantages of the pneumatic. The big diamond tread blocks, it is said, will prevent tread separation, will prevent skidding and afford greater traction.

The All-weather tread solids is manufactured in the following sizes: 40 x 6 in., 40 x 7 in., 36 x 8 in., 36 x 10 in., 40 x 10 in. and 40 x 12 in.

New Hauck Blue-Flame Burner

A new device for burning oil in place of small coal fires and gas burners is now being placed on the market by the Hauck Manufacturing Co., Brooklyn, N. Y. This new oil gas burner is said to convert ordinary kerosene or coal oil into a perfect combustible gas, producing a clean, blue flame.

One of its most prominent features is said to be the elimination of the so-called "flare-back." The fact that the flame is totally odorless and noiseless is also cited by the maker as being a feature worthy of consideration.

The burner, when in full operation, can be covered with a sheet of metal or as-



Hauck Blue-Flame Oil Gas Burner
It produces a clean, blue flame and is particularly suited for operating in close quarters

bestos, so that the flame is prevented from expanding fully, making the burner particularly suited for operation in close quarters, where absolute safety is required.

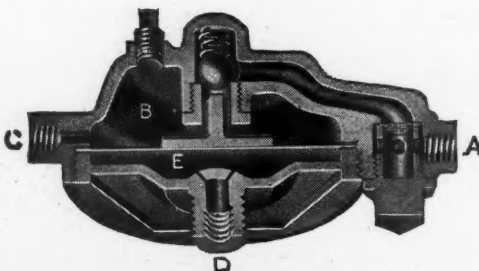
Willis-Warner Protect-a-Motor

The Willis-Warner Protect-A-Motor, incepted and manufactured by the Willis-Warner Mfg. Co., Kansas City, Mo., is a simple device which automatically stops the engine when the supply of lubricating oil is exhausted or when the oil pump fails to function. When the fuel supply becomes exhausted the engine simply refuses to run. No harm is said to be done, and when a new supply of fuel is added the engine performs as usual.

The Protect-A-Motor is an automatically controlled valve for installation in the fuel line near the carburetor. The fuel passes through it. The fuel cut-off valve is automatically controlled by the action of the oil pump. Should the supply of lubricating oil become exhausted or the oil pump fail to function, the valve immediately closes, shutting off the fuel supply to the carburetor and stopping the engine.

The fuel enters at A (refer to the accompanying illustration), through ball valve into supply chamber B, and out at C to the carburetor. The oil pressure enters at D, and against diaphragm E, causing the valve to remain open, as long as there is oil pressure. There is always sufficient fuel in the carburetor, fuel line and supply chamber to run the engine until oil pressure opens ball check valve.

It is not necessary to drill holes for the installation of this device. It can be utilized with equal success on automobile, truck and tractor. The retail price is \$20.



"Watchman Under the Hood"

New Firestone Universal Truck Tire

The Firestone Tire & Rubber Co., Akron, O., announces the perfecting of a new type of truck tire, the Firestone Giant Cushion, which is a development of the small cushion tire and the giant single-grooved solid. The company claims that this new tire is universal in its adaptation to trucks. Firestone experts say that the new Giant Cushion may be placed on all sizes of trucks, from three fourths of a ton to seven and one-half tons, and in every class of service.

It is pointed out that the large volume of rubber, width of tread and large contact on the road make possible a low



Firestone "Giant Cushion" Double-Groove Solid Truck Tire

pressure and strain per sq. in. on the tire. As a result, it is further reasoned, less deflection is caused and less heat generated, which makes the tire live longer and stay lively.

The tread design is a combination of the so-called cup tread of the small cushion and the grooves of the Giant, a feature claimed to make the Giant Cushion as perfect a non-skid as an airless tire can be. The cushion shape, the flexibility of the rubber, together with the combination of cups, grooves and crossbars, is said to keep down the tendency of the tire's edges from breaking off. This tire is built in accordance to S. A. E. dimensions and to carry heavy loads.

Edstrom One-Hand Wrench

According to the manufacturer, the Edstrom Machinery Co., Cay Station, Ill., the Edstrom wrench is designed to supplant the adjustable wrench for speed and service, and the sets of open-end wrenches for speed and weight.

This wrench is said to set and lock instantly and automatically on the nut. It is set by a thumb lever and stays set against the roughest handling and most powerful application.

It is stated that it cannot slip because the spring incorporated in it brings the jaw tight against the nut the first time and is locked against slippage. This tool is made of drop forged steel. The list price is \$2.50.

How a Thoroughly Motorized Department Store Cares for Its Transportation Equipment

Over Eight Hundred Horses Were Required Twelve Years Ago. Today They Operate Three Hundred Trucks

MARSHALL FIELD & CO., wholesale and retail dry goods firm of Chicago, lead the world in the delivery department by motor trucks and in the garage and service station maintenance. They have recorded the greatest advance in fleet operation, abandoning the last horse three years ago. With the departure of the last equine, came the erection of modern garages, in marked contrast to the stables and warehouses which were in vogue during the era of the quadruped. There is a force of 350 employees engaged solely in the delivery department of the wholesale and retail stores.

The garage and service structures represent approximately a half million. They are second to none. The main plant, located at the corner of Jefferson and Polk Sts., alone cost in round numbers \$400,000. It was installed three years ago, displacing an old horse-barn plant. There are five sub-stations. They provide ample facilities for taking care of the deliveries throughout the entire city, each be-

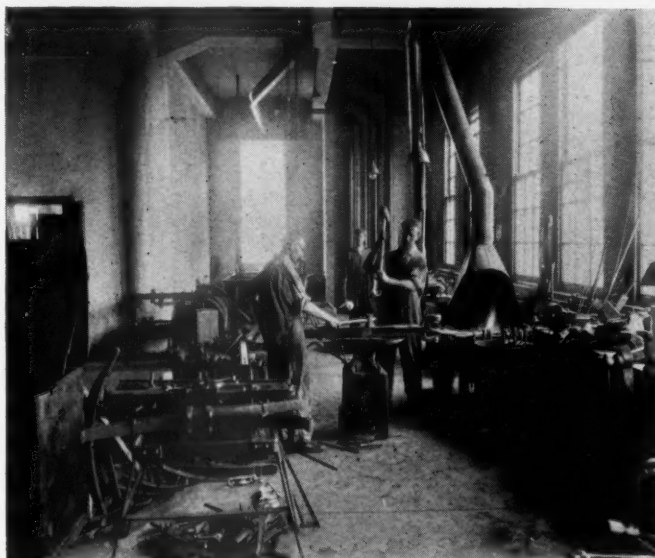
ing located at the most propitious radiating center of its respective district. The main plant at Polk St., attends to the loop and central district deliveries.

William Yaeger is general superintendent in charge of all garages and sub-stations. His assistant is T. Ben. John-

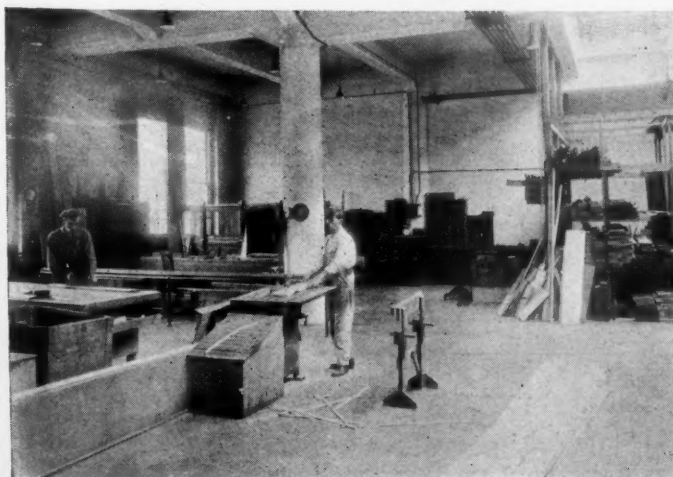
son. These gentlemen make their headquarters in a suite of offices in the Polk St. plant. The delivery trucks serve a district of approximately 200 square miles. About 300 cars are in constant operation. The proportion is about 75 per cent electric and 25 per cent gasoline. At the

Polk St. station 100 electrics and 25 gasoline trucks are housed. The remainder are divided among the five sub-stations.

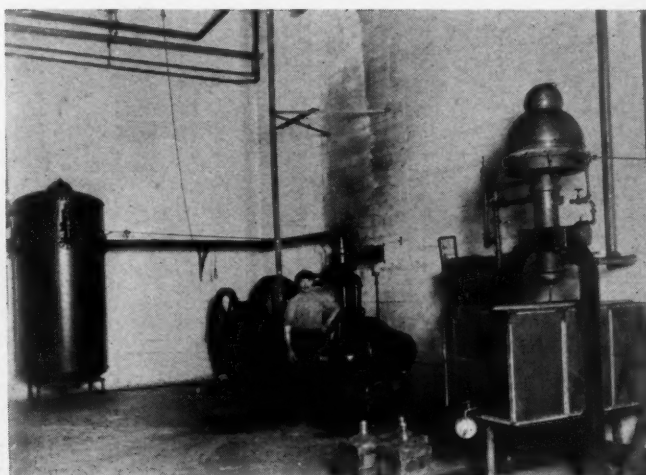
The electrics are universally used for retail parcel delivery and range from 750 lb. up to 4½ tons capacity. The majority are of the former size and are assigned exclusively to the retail department. Ten electrics of two-ton capacity, are assigned to small stores within a radius of 25 miles, maintaining deliveries from the wholesale department. Six gasoline trucks of 3½ tons capacity, are utilized in handling heavy boxes and bales to and from the railroads, and four of 1½ tons capacity are assigned to small store deliveries, which average a mileage of 50 daily. All loop deliveries of the wholesale store are handled by 1½ ton electrics.



Corner of the Electric Repair Shop of the Main Marshall Field & Co. Service Station



Carpenter Shop of the Marshall Field & Co. Garage. Tops, Floors and Other Wooden Work is Repaired in This Department



Method of Distilling Water for Batteries. The Addition of This Equipment to the Marshall Field & Co. Garage Has Resulted in a Big Saving in Battery Service

The first move made by the firm to get away from horse delivery was in 1908 when a gasoline motor truck was purchased, believed to be the first reaching Chicago. Twelve years ago the firm required 800 horses to take care of deliveries. With the gradual increase in the number of gasoline and electric cars, the horses were disposed of proportionately.

When the period was reached when a main garage and service station became imperative, a great deal of thought and planning was expended upon the layout. No outside aid was sought. The two superintendents of the retail and wholesale stores called into consultation the heads of the delivery department and the various outlines of buildings, interior arrangement, methods of service, distribution and location of sub-stations, and territory to be served, garage accounting, and the numerable other details incidental to such a vast and complex delivery system, were carefully worked out and each move thoroughly discussed. The result was a triumph in the housing and servicing of fleet motor vehicles. The main plant at Polk St. comprises four buildings, composed of brick and concrete, with steel framing, utilized exclusively, to ensure the elimination of fire hazard to the greatest degree humanly possible.

Each of the four buildings has a frontage of 70 ft. and a depth of 237 ft. Two are of two stories and the other two have but one story. No. 1 building contains the administration offices and also a parcel office. The floor space to the rear of the offices is utilized for cars, either in storage or active service. The second floor of the No. 1 building is utilized as a carpenter shop for the repair of cushions, tarpaulins, canvas, etc. The wash room,



One Type of Truck Now in the Service of the Marshall Field & Co.

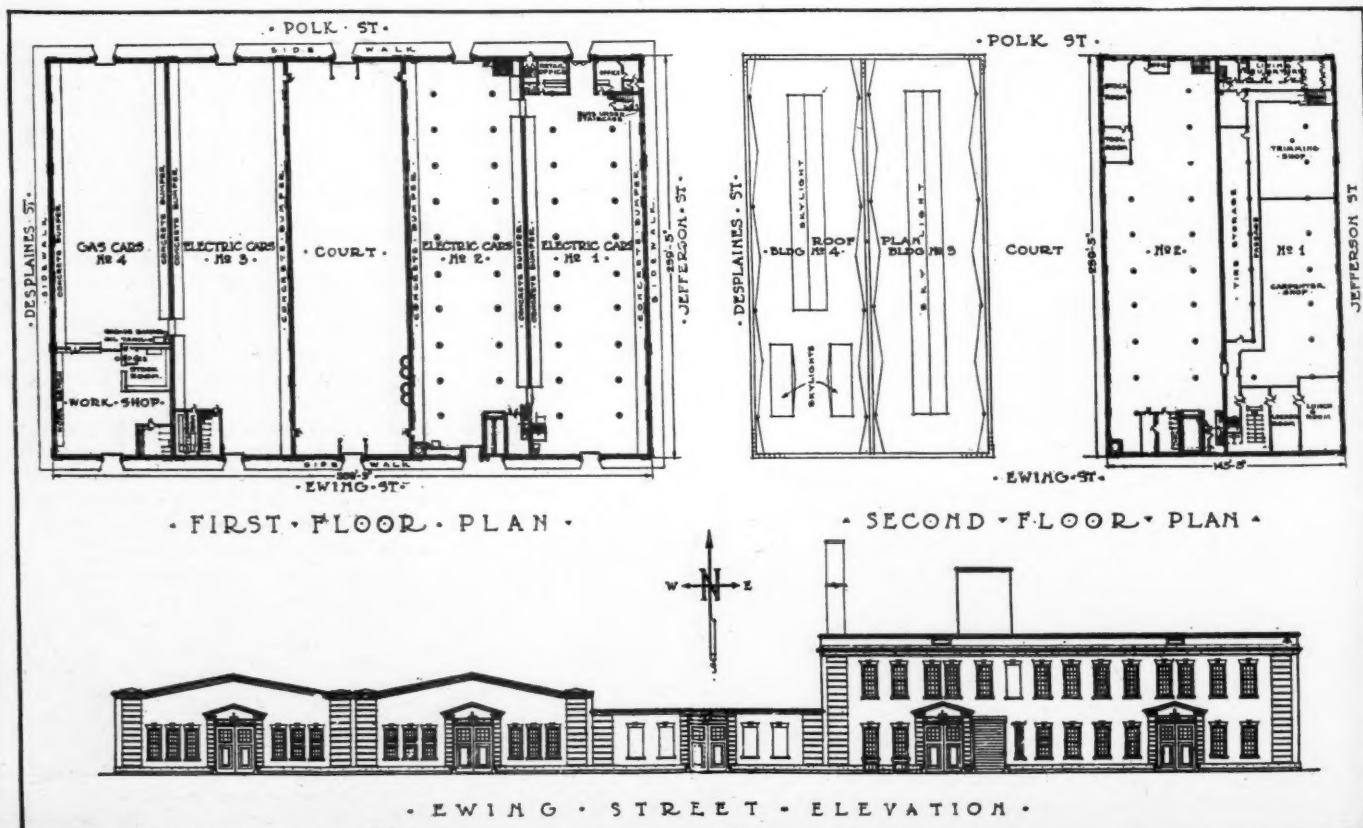
lavatories and shower baths for the exclusive use of employees, are located also upon this floor.

This recognition of the convenience and comfort of the employees is deeply appreciated by them and does much to cement the good feeling which has always existed between employer and employees since the Field firm was first launched.

Building No. 2 is used exclusively for electric cars, the same as No. 1. The latter is restricted to the smaller type of the electrics and the former to the two- and three-ton type. The second floor of No. 2 building is devoted to the repair shop for gasoline and electric cars, all of the heavy jobs of the fleet being given attention here. This department has a very complete equipment of lathes and machines of various kinds. Spare parts are stored there and there is also a complete stock of bolts, nuts and everything

else needed in repair of motor vehicles.

Building No. 3 is reserved for the four- and four and one-half-ton electrics, and building No. 4, which is of the same size, is reserved for gasoline cars, and has a very complete repair shop annex for the lighter overhauling jobs, testing of engines, etc. No. 3 building contains the meter room in which there is an individual meter for each car charged. Each electric is charged every night when in active service. The charging connection comes from the ceiling. Between each pair of supporting pillars there is space for two stalls. Cars always occupy the same stall unless in the repair shop. Two cords, with plugs, drop from the ceiling and supply the "juice" for charging. The cords are in pairs, and when not in use, are caught at the side of one of the pillars by a hook. Fuel for the gasoline cars is supplied each morning, just before starting time. To fill the tanks in the eve-



General View of the Marshall Field & Co. Garage and Service Station. It is Located at Polk and Jefferson Streets, Chicago

ning increases the fire hazard, due to a possible leak and also might be wasteful of gasoline. Radiators are also filled in the morning by service men, two being assigned to day duty and two to night, in each building.

Every driver is supposed to be in his seat and ready to leave the garage at 7.30 A. M. every day in the year excepting Sundays and holidays. By 7.45 all wholesale cars have departed, and by 8 the last of the retail cars. The cars with the greatest mileage and largest territory go first, while those with the lesser mileage depart last. This system is always maintained in order to make arrival periods at each destination as nearly uniform as possible.

Selection of electric cars for the retail and wholesale store delivery was made because of the numerous stops. Where the hauls are longer and the stops fewer, gasoline cars are preferred. The average retail parcel car makes 150 stops per day. The weight and capacity of all electric and gas cars is gauged by the character of the retail or wholesale delivery service, district to be served, mileage, condition of the pavement and roads, etc. Assignment is made following a careful study of conditions, with a view of securing the maximum of efficiency and economy of operation.

Inspectors give the batteries of all cars nightly inspection and replace broken jars and take care of other service. In the

event that adjustments or repairs cannot be completed by morning, a substitute car is shifted to the stall and the car in trouble sent to the repair shops.

The meter department is one of the most complete of its kind in existence. There are three charging boards, one in each building housing electric cars. Each board has forty circuits. Each car has its individual number, circuit and meter. All correspond. The inspector who supervises the charging becomes familiar with each car and knows when there is any unusual increase in the consumption of electricity or any unusual decrease. Anything out of the normal is given instant attention.

All cars are given annual overhauling. After the rush of the holiday season the repair shops are operated with the maximum of mechanics and efforts made to do the bulk of the repair work during the duller seasons. The repair shops are models and the equipment complete. The carpentry, upholstery, stock, parts and other departments have no superior. They represent the last word in efficiency. The plant has its own distilling plant and there is a large saving since this was introduced. The wrecking outfit is efficient and the crew well trained. Drivers, although well drilled and able to solve most of their problems without calling for help, are sometimes the victims of other's recklessness and machines too badly damaged to operate without the aid

of the derrick. The relief outfit operates with the speed and expeditiousness of the municipal fire department. There is a crew always ready to respond to any call, day or night, and there is no lost motion of waste time.

The firm also prides itself upon its system of garage accounting, reports from drivers and other records. The system in vogue represents years of revision, the development from the days of the horse delivery, and has been found to be entirely efficient yet simple and easily handled by all concerned.

In all other directions the Marshall Field delivery system excels. The firm has not spared money. It has realized that the best is the cheapest. The volume of business handled is among the largest of any similar firm in the world. It was one of the first to discard the horse. The main garage and service stations rank with the finest in the world. The results are all that could be desired. There is a marked absence of friction. There is the utmost harmony among the army of employees. The firm has never been confronted with a strike. During one of the greatest strikes in the history of Chicago a few years ago the employees of Marshall Field alone kept at work. Those of every other firm yielded to the orders of the bosses of the drivers' union. It is the policy of the firm, by fair treatment, to retain the loyalty of all employees. Some have been driving for forty years.

Has Your Motor Truck Been Prepared for Summer?

THE sweltering days of summer are again with us and service stations are again filled with heat-afflicted motor trucks. Is your truck in the steaming-radiator line? Or has it been prepared to give uninterrupted service through the summer months?

Overheating and other common hot weather troubles are usually due to lack of forethought and to mistakes that can be easily avoided. The main points which require attention are briefly outlined below by A. F. Masury, Chief Engineer of the International Motor Co.

1.—Do you understand the truck's cooling system thoroughly? If not, now is the time to go over it carefully and find out all there is to know about it. See that the flow of water is not impeded by any sort of obstruction and that the overflow pipe is not bent below the level of the base of the radiator filler. Be sure that the overflow pipe is not clogged or flattened.

2.—Is the radiator clean? The front of the radiator should be free from dirt, license plates and signs. Also, the back of the radiator should be unobstructed so that nothing will hamper the circulation of the air.

3.—Are the hose connections water-tight and is the hose in good condition? Be sure that the rubber has not been affected during the winter by an anti-freeze solution. Only the best quality rubber hose should be used, as the inside tubing of cheap hose is easily worn away and the rubber particles carried along with the water clog up the radiator.

4.—Does the fan turn freely and is the belt tension right? The fan should be clean and its bearings should be well greased. A good test is to turn the fan by hand with the engine shut off. If it is possible to slip the belt easily, but not possible to spin the fan, the tension is right.

5.—Is the carburetor choke in proper repair so that it opens all the way? Better open the seasonal shutter on the hot-air tube. Is the float level correct? If too high, slight flooding will cause an over-rich mixture.

6.—Does the ignition system furnish a spark of sufficient strength? A weak spark due to excessive lubrication of the magneto, dirty breaker or distributor, or weak magnets, will have an effect similar to late spark timing and overheating will result.

7.—Are the valve tappets properly adjusted? They should have from .008 to .010 in. clearance, which may be gaged by about the thickness of an ordinary post card.

8.—Are the cylinders free from carbon? If not, remove it.

9.—Is the oil in the crankcase clean? Gasoline, dirt, or other foreign substances will impair the quality of the oil in the crankcase, resulting in overheated parts due to insufficient lubrication. The oil reservoir should be drained every 1500 mi., the walls thoroughly cleaned, and a fresh supply of oil should then be put into the crankcase.

10.—Are you using the right grade of oil? Because of the increased temperatures it is often advisable in summer to use a heavier grade of oil than in winter.

11.—Are the exhaust pipe and muffler clean? Practically 40 per cent of the heat of combustion escapes through the exhaust. It follows, therefore, that if any part of the exhaust system is obstructed, a part of this heat must be carried off by the cooling water, which will naturally raise its temperature.

12.—Are the brakes free? A dragging break will cause overheating in hot weather that might not occur in cool weather.

Care and Storage of Wood Wheels

(Continued from page 35)

the life of the truck or passenger car, barring accident or abuse.

In view of the somewhat varied methods in vogue for storing wheels when received from the wheel manufacturer, the following suggestions are made.

Hubbing Wheels

(a) Most truck wheels are shipped without hubs and, of course, without tires. The hub and its flanges naturally strengthen the wheel to a very considerable degree, therefore, some care should be exercised in handling the wheels on the unloading dock and until hubbed. The wheels are carefully glued in the spoke mitre joints and will really stand rough handling; but if they have been bored to size, it is certainly unwise to risk even a slight distortion that the fall from a tall pile to a hard floor might effect in any kind of wheel.

(b) Put hubs in the wheels as soon as it can be arranged, for the hub is an essential part of the wheel. There has been much discussion as to the proper tightness for the hub in the bore of the wheel. It is quite generally conceded that a light press fit is the best practice, but the fit can be many thousandths of an inch loose without seriously affecting the wheel if it is properly assembled. On the other hand, it endangers the tightness of the arch structure of the wheel if the hub is forced into the bore under heavy pressure; so, to avoid any such danger, wheel manufacturers advocate what is known as a "hand fit." In other words, the hub should go into the wheel with only such pressure as can be applied by the hands. Recent practice by the wheel manufacturers has been to bore wheels (when requested) so as to hold them between a line and line fit on the hub and .020 in. loose. The three coats of oil and primer given to the bore by the wheel manufacturer reduce it in somewhat varying amounts, but this can be easily rasped to snug fit when the wheel is hubbed. If there is a trace of shake in the hub when it is placed in the wheel bore, remove the hub, smear some red-lead or white-lead paste in the wheel bore and press the hub in again. In fact, the best practice is to smear red-lead or white-lead paste in the bore in any event, and also cover the inside of the hub flanges with the same paste.

In hubbing wheels, some attention should be paid to the fit of the loose flange over the hub barrel. Preferably this should be a light fit—say from .002 in. to .005 in. tight. The fit should not be more than .001 in. loose on hub barrel diameters of 4 in. or under, nor more than .002 in. loose on diameters above 4 in. The length of the fit in the flange bore is preferably not less than $\frac{5}{8}$ in. for a 4-in. bore and 1 in. for a 5-in. bore.

In drilling the bolt holes, see that they are located directly on the mitre joints between the spokes. Do not drill a hole

through the middle of the spoke head of the standard type of artillery wheel. For motor trucks (1½-ton capacity and up), use as many bolts as there are spokes, and daub some red-lead or white-lead in the holes just before the bolts are entered. Be a little particular about the steel in the bolts and use judgment in tightening them. There is a right way to do everything and it is usually the cheapest.

The above remarks on flanges and bolts must of course be taken up with the source of supply if not made in your own plant. For proposed standard designs of motor truck front hubs, see A. W. W. M. A. pamphlet on Hub Standardization, issued December 1, 1920; and see pages 192-193 of the February issue of the Journal of the S. A. E. for further details as approved by the Truck Division of the S. A. E. Standards Committee on December 16, 1920. Slight modifications in these designs have since been made—they consist in moving the integral flanges on hubs No. 7, No. 8 and No. 9 inward toward the steering pivot by $\frac{3}{8}$ in. in each instance. Also, a series of hub dimensions to take ball bearings and metric size roller bearings has been approved by the Truck Division of the S. A. E. Standards committee.

Storing Protected Wheels

(c) If the wheels are to be stored for any length of time (before or after being hubbed), put them in a room where they will be shielded from an excess of moisture. It is good practice to give them a coat of paint, but this is not essential, if the wheels are already primed, except in the arid southwest. Do not let water drip on them and do not put them on a wet floor. If the floor is of steel or concrete and apt to be damp, put down some dry 4 x 4 stringers and pile the wheels on these. In localities where there is a great deal of dampness in summer, close off most of the ventilation and cause the temperature of the air in the room to rise and check the tendency of the wood to take up moisture. In winter, the storage room should be well ventilated if there is artificial heat in it, otherwise the warm air will slowly dry out the wood. Wheels should not be piled near steam pipes where the heat will dry and shrink them, if they are not thoroughly protected by paint. Some wheel manufacturers advocate storage rooms with no artificial heat and with open ventilation under all conditions. Wheels thus stored **must be protected**, and the primers must be first class and conscientiously applied. Bear in mind that the condition to be guarded against is that under which the wood can absorb too much moisture, for this will cause it to swell and take a permanent set. When the wheel dries out, later, it will surely be loose and, very likely, permanently so. Should wheels, however, become excessively dry in storage they are not damaged and will become tight and serviceable as soon as they ab-

sorb a small amount of moisture from the atmosphere. In the past, some wheels have not been properly primed, and they have been carelessly exposed to rain and snow in shipment to the car or truck manufacturer. When such wheels are put in dry storage they will become permanently loose, or will only become tight when water soaked to an extent that they will not properly hold paint. As soon as the paint film fails they dry out again and become unserviceable.

Sometimes truck or car manufacturers order wheels with only a coat of oil, so that they can take a natural wood finish; for the natural wood, when properly rubbed and varnished, is unapproached for beauty of appearance. However, when wheels are stored for any considerable length of time, a coat of linseed oil affords a very slight protection against the absorption of moisture or against drying out, and there have been many complaints that wheels were loose when taken from the store room for car assembly and finishing. In almost every case this complaint is heard late in the winter and in early spring, after the artificial heat in the storage room has caused the wood to shrink. A few days exposure to outdoor atmospheric conditions will tighten these wheels upon again, after which they can be finished and varnished.

When a car or truck manufacturer buys wheels which are shipped to him without proper paint protection, he must therefore be quite careful about handling and storing them; because the very structure that makes wood of such great value as a wheel material, has also the hygroscopic properties which cause it to vary in dimension if not properly protected on its surface. It is not at all difficult to properly store wheels which have no surface protection of any kind. Experiments have been made at the U. S. Forest Products Laboratory, which have determined how much moisture wood will contain under varying conditions of atmospheric temperature and relative humidity.

These tests show that for any given temperature the per cent of moisture content of the wood rises at a considerably slower rate than the per cent of the relative humidity—also that, as the temperature rises the moisture content (for a given relative humidity) drops. Wheels unprotected by paint or other surface coating should be stored under conditions that will hold the moisture content at about the 8 per cent with which they left the wheel manufacturer—ranging, say, from 6 per cent to 10 per cent because the change in dimension up or down between these limits is well within the elastic limit for compression. We find that at 70 deg. F. the average relative humidity from day to day can vary between 30 per cent to 55 per cent without adversely affecting the wheel. In fact, even if the relative humidity drops to 10 per cent, the effect will only be to loosen it temporarily, for it will tighten again when it reabsorbs moisture.

A condition to be more carefully guarded against is that of an average relative humidity above 60 per cent, which might swell unprotected wood to a point where

it would take a permanent set. Now, as long as the wheel holds a fair part of the excess moisture, it will remain tight and perfectly serviceable. It would not be wise, however, to use the wheel on a truck operating in the southwest, for when it dried out to some extent it would loosen. When the relative humidity rises an increase of temperature will offset its effect on the wood. At 212 deg. F. the relative humidity must rise to 80 per cent before the wood will take up more than 10 per cent moisture. Where the humidity in the storage room, therefore, is high, an increase in the room temperature will offset it to a greater or less degree. On the other hand, with unpainted wheels, care must be taken that they are not exposed to conditions where low temperatures and high relative humidities exist. At 35 deg. F. the relative humidity should not exceed 50 per cent to be on the safe side. The relative humidity can be readily determined by use of the ordinary wet-and-dry-bulb thermometer.

The protection afforded by three coats of primer and paint slows up any changes

by so great an amount that ordinary good judgment as to care and storage is all that is necessary.

Wood wheels, properly made and primed by their manufacturer, demand as little special storage attention as any other important unit of a car or truck; but purchasers should clearly understand their characteristics of material design and construction. They should be sure that their purchase specifications cover essential points, and should be familiar with the facilities and practices of their sources of supply.

At the present time it is likely that quantities of wheels are lying in storage, and may continue to do so for several months. The information given in this article may be of assistance to any motor car or truck manufacturers if wheels are being stored for future use. A small amount of attention promptly given to this important subject will amply repay one, and the writer suggests that the matter be taken up with the manufacturer of the wheels, who will co-operate to meet the conditions of the particular case.

Will Manufacture Dorr Miller Differential

The Toledo Automotive Products Co., of Toledo, Ohio, have taken over the exclusive manufacture and sale of the Dorr Miller gearless differential and are now in production on this well-known piece of equipment at the Toledo plant. For the present only sizes for motor trucks will be manufactured, together with a replacement differential for Fords and Chevrolet 490's. Other passenger car work will be taken up later.

No change has been made in the design of the differential, which has already been described and illustrated in these columns, but a better alloy of steel, with better heat treatment, is possible in manufacturing it under the present auspices.

Dorr Miller will be in charge of the sales and engineering departments of the company and the executives are G. Huette, president, George Salzman, of H. G. Walker Co., Cleveland, secretary; A. R. Class, of the Steel Products Co., vice-president; R. E. Wickwire, treasurer, and R. W. Randall, general manager.

Manufacturing rights of the Dorr Miller differential in Germany have been contracted for by the Erste Automatische Gusstahlkugelfabrik, large manufacturers of bearings in that country. The Benze company have made exhaustive tests of the differential and are figuring on using it in the automobiles they manufacture.

Inquiries made recently by the Midwest Rubber Manufacturers' Association show an increasing tendency among the tire manufacturers to oppose the present system of mileage guarantee. Several of the companies contend that tires should sell strictly on their merit alone.

Special Partition Body for Road-Building Work

THE most recent development of the Heil Co., Milwaukee, Wis., in road building equipment for motor trucks is a special road building body designed and adapted for the road contractor of today. Contractors today purchase short wheelbase trucks of from 2 to 2½ tons capacity, equipping them with partition bodies for handling aggregate, which is sand and gravel, to concrete mixers.

The Heil body for a short wheelbase contractor truck is about 7 ft. long. Believing that the square-cornered, straight-sided body with the front end crowned to be the most practical for all around contractor service, this company has designed its new job along these lines. Square corners permit tile, bricks, cement blocks, etc., to be loaded more compactly; straight sides adapts the body for spreading, permitting the material to flow out more evenly; and the front end crowned prevents any of the material being transported from spilling over onto the cab or truck mechanisms.

A double-acting tail-gate allows the body to be employed either as a dump body or a platform body, with increased loading space when the tail-gate is lowered. This body is also equipped with a chain spreader device, which allows crushed stone, gravel and the like to be spread upon the highway to any thickness desired.

Removable partitions are used so that several batches of material can be hauled at once. These partitions are easily removable, and are operated by a lever which is attached to an eccentric. When the lever is raised the partition is raised above lugs, which are placed in the bottom of the floor, and when the body is

in the raised position the partition through the action of gravity swings open.

The location of the partitions depends upon the size of the mixer. If desired, in fact, it is to the advantage of the contractor, several points on the body for attaching the compartment can be provided. This provision enables a contractor to haul for different sized mixers.



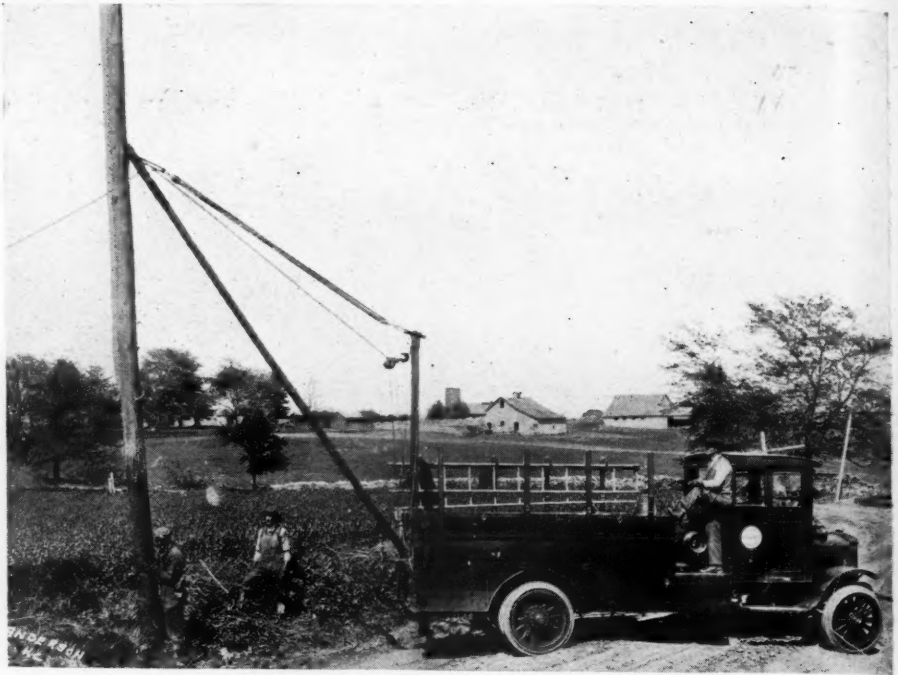
The Heil Special Road-Building Body

Wire Reinforcement Produces Stronger Highway

The use of the motor truck in Southern California has grown so rapidly that the road building authorities of that section have found that the building of concrete highways is a question of "building for the motor truck" rather than for the lighter vehicles. This naturally means a thicker, heavier roadway with a reinforcement that will assist it to "stand up."

The accompanying illustrations show a novel method of reinforcement that has been devised and put into use by the road department of Los Angeles county, Cal. It is used on all sections that have a slight grade and also in many places that are practically on the level. This road department has learned through experience that a little forethought in the laying of the concrete highways will add materially to the length of the life of the roadway. If any body of officials is in a position to know what is the best and most satisfactory method to employ it is probably this particular body of road builders, for there is hardly a county in the country in which a greater mileage of concrete highway has been laid during the last few years than has been constructed in Los Angeles county. The roads have been laid over all sorts of materials from desert sand to adobe, and it has been found that it pays to give a light reinforcement to the roadways even though they are constructed on practically level stretches where the base is favorable. Features that also appeal to the authorities in charge of this work are the rapidity with which the work may be done and the inexpensiveness of the operation.

"Hog wire" of a very heavy character is employed. This wire is galvanized and is about one-eighth of an inch in thickness and has a mesh of about 8 in. It comes in rolls about 8 ft. wide and 150 ft. long. In the construction of the cross country highways in Los Angeles county, the roadways are, ordinarily, approximately 18 ft. in width. For these roads two 8-ft. rolls of this wire are used. The



Setting Telephone Poles With Winch and Derrick
The Bay City Type D winch in combination with a derrick easily sets the pole in place

inside edges of the wire are placed close together, so that there is a foot on either side of the wire that is not reinforced. It has been found that the wire in the reinforced section assists very materially in strengthening this narrow outside strip.

The method of applying the wire to the roadway is simplicity itself. The rolls of wire are located directly behind the mixer and beneath the concrete conveying arm of the machine. It is immediately in front of the finished roadway, so that as the concrete is laid the coils of wire are unrolled. Each time the mixer is run ahead a few feet two of the workmen unroll the wire six or eight feet. The operation is so simple and easy that but little additional time is required in laying the reinforcement wire.

Another feature that adds considerably to the effectiveness of this work is the assembly of piping that has been arranged for keeping the wire in the center of the thickness of the concrete. This "spacer," as it is known, is placed directly upon the roadbed and the wire is run upon it. The forward end of the spacer is attached, by means of a heavy chain, to the rear end of the mixer. As the concrete is laid and the wire is unrolled, the mixer is run ahead, pulling the spacer with it. This device is always drawn ahead of the finished work or just ahead of the rear end of the concrete conveying arm of the machine, which operates above the wire, spacer, etc.



"Hog Wire" is Used as a Reinforcement in Concrete Roadway

The Chicago Automobile Trade Association, with its customary energy and progressiveness, is taking a leading part in preparations for the Pageant of Progress which that great city will stage during late July and early August. From present indications the automobile men will have the greatest exhibit of any industry on the Municipal Pier, occupying over 40,000 square feet of show space with cars and trucks.

Motor truck and passenger car dealers participated in a great demonstration during the week of June 20, when personal invitations were delivered by motor car to mayors of every city within a radius of 40 miles of Chicago.

The Pageant of Progress will run from July 30 to August 14, and over two million people are expected in Chicago from surrounding cities. The auto and truck men will participate in many of the parades and other spectacular features of the event.

The technical knowledge that comes to you from **SKF** engineers is



as it is the sum of the data gathered by **SKF** organizations in all industrial countries.

This fund of engineering information we bring to the fabrication of all products bearing the mark **SKF** and the operation of those industries which we are requested to supervise. In order that complete reliance may be placed in the endorsement expressed by the mark **SKF** it is necessary not alone that we control and supervise each step in the manufacture of a product but also its final installation.

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Metal and Rubber Markets

Lack of Credit Holds Back Steel Movement

For a time it was the common belief that prices were the cause of the trouble in the steel industry, that they were the only obstacles clogging the road of progress. Believing that the only panacea for revival of business was a reduction in prices, steel was marked down. A slight flurry of activity resulted, but it was short-lived and then movement settled down to the former pace, and slower. The market became worse and worse. Many concerns finding their positions rapidly becoming untenable, succumbed to the temptation of underbidding to keep their mills in operation.

It was finally conceded that the steel market stagnation is not attributable to price conditions, but is a direct result of the ultimate distributor's and consumer's inability to secure money and credit. If the ultimate consumer, whose needs are measured by his purse or his ability to secure money and credit, will not buy, then the whole machinery of trade must stand still.

Steel Products Prices

Per ton—Pittsburgh—	
Bessemer billets	37 00 a 39 00
Open hearth	37 00 a 39 00
Forging billets	42 00 a
Sheet bars	39 00 a
Slabs	35 00 a 38 00

Sheets

The following prices are for 100-bundle lots and over f.o.b. mill:

Blue Annealed Sheets—	
Pittsburgh (base)	2 90 a 3 10
Philadelphia	3 25 a 3 45
New York	3 28 a 3 48
Galvanized Sheets of Black Sheet Gauge—	
Pittsburgh	5 00 a
New York	5 38 a

Finished Iron and Steel

Tank plates, Pittsburgh.....	2 00 a 2 20
Tank plates, New York.....	2 38 a 2 58
Steel bars, New York.....	2 48 a
Steel bars, Pittsburgh.....	2 10 a

Iron and Steel at Pittsburgh

Bessemer iron	24 96 a
Bessemer steel, f.o.b. Pitts....	37 00 a 39 00
Skelp, grooved steel	2 20 a
Skelp, sheared steel	2 20 a
Strip steel, cold	5 00 a 5 50
Strip steel, hot	2 75 a
Ferromanganese (80%)	75 00 a 80 00
Steel, melting scrap	13 00 a 13 25
Iron bars	2 75 a

OTHER METAL PRODUCTS.—Following are current prices for brass and bronze products:

Copper sheets, hot rolled.....	21 25 a 21 50
Copper bottoms	28 75 a 29 00
Seamless tubing, bronze	22 50 a
Seamless tubing, copper	22 00 a
Copper rods .....	.. a 20 00
Low brass sheets	17 75 a
Low brass rods	18 75 a
Brazed tubing, brass	27 50 a
Brazed tubing, bronze	32 25 a
Brazed tubing, copper	32 25 a
Seamless high brass tubing.....	20 00 a
Seamless low brass tubing.....	21 50 a

ANTIMONY.—The market remains quiet and easy with heavy local supplies. Prices are without quotable change.

MANGANESE.—There is no improvement in demand for manganese and chrome, and the market for both is easy, without attracting buyers, who are well supplied.

OLD METALS.—Aluminum scrap is weak. Casting and old sheets are neglected. With the exception of a little business for No. 1 crucible copper, which is mostly done between dealers to cover present inquiries, the copper market is dull at unchanged prices.

Following are sellers' and buyers' prices f.o.b. New York:

Aluminum—	Buying.	Selling.
Cast scrap	8 3/4 a 8 7/8	9 1/2 a 10
Sheet scrap	8 3/4 a 8 7/8	9 1/2 a 10
Clippings	12 3/4 a 13 1/2	15 1/2 a 16 1/2
Copper—		
Heavy machinery comp..	8 3/4 a 9 1/4	10 a 10 1/2
Heavy and wire	8 1/4 a 8 1/2	9 1/2 a 9 3/4
Light and bottoms	7 1/4 a 7 3/4	8 3/4 a 8 3/4
Heavy, cut and crucible.	9 1/4 a 9 1/2	10 1/2 a 11
Brass, heavy	4 1/2 a 4 3/4	5 1/4 a 5 1/2
Brass, casting	5 1/4 a 5 1/2	6 1/2 a 6 3/4
Brass, light	3 1/4 a 3 3/4	4 1/2 a 4 3/4
No. 1 clean brass turngs.	4 1/4 a 4 1/2	5 a 5 1/4
No. 1 comp. turnings.....	6 1/4 a 6 1/2	7 1/2 a 7 3/4
Tea lead	2 1/2 a 2 3/4	2 1/2 a 2 3/4
Lead, heavy	3 1/4 a 3 1/2	3 3/4 a 4
Zinc scrap	2 a 2 1/2	3 a 3 1/4
Solder joints	5 a 5 1/2	6 a 6 1/4
New zinc clippings	3 1/4 a 4	4 a 4 1/2
Pewter dishes	16 a 17	18 a 20
Block tin, scrap	25 a 27	29 a 30

Rubber Unsettled

Offerings Relatively Small, But Little Buying Interest

Indications of a renewal of buying interest in factory quarters had for a time checked the downward movement in plantation rubber prices, but the demand was soon satisfied and at most was not of a character to furnish ground for hopes of a permanent improvement.

Para—Up-river, fine	15 1/2 a ..
Up-river, coarse	7 1/2 a ..
Island, fine	16 a ..
Island, coarse	7 a ..
Cameta	7 1/2 a ..
Plantation—	
Amber, No. 1	11 1/2 a ..
Amber, No. 2	10 1/2 a ..
Amber, No. 3	10 a ..
Smoked ribbed sheets	12 1/2 a ..
*Centrals—Corinto .....	.. a 6
*Esmeralda .....	.. a 6
*Mexican scrap .....	.. a 5
*Guayule, wet .....	.. a 10
*Guayule, dry .....	.. a 48
*Balata, block, Trinidad.....	.. a 73
*Balata, block, Colombian .....	.. a 26
*Balata, Panama .....	.. a 25
*Balata, sheet .....	.. a 71
*Nominal.	

SCRAP RUBBER.—No demand of consequence for any description has appeared and prices are scarcely quotable.

Tires, automobile	1 a ..
Inner tubes, No. 1 .....	.. a 8
Inner tubes, No. 2 .....	.. a 5

Good-bye, Street Cars; Hello, Trucks!

Realizing the necessity of providing good through routes for motor truck traffic, Detroit is taking the lead among American municipalities in looking to the future in planning for this type of traffic.

The latest evidence of this proper vision is in the order issued by the city council for the electric railway company to tear its tracks up from Lafayette Avenue, so that the street may be given over entirely to vehicular traffic. Lafayette parallels Fort Street, on which cars run, and leads to one of the busiest manufacturing centers from down town.

Giving this street over to traffic which will be largely by motor truck, will relieve other streets of mixed traffic and will make it possible for trucks to make much better speed on their runs.

New Niehoff Catalogue is a Work of Art

A neat brown imitation leather cover with title attractively embossed at the top, gives the new catalogue of the Paul G. Niehoff Co., Chicago, Ill., that touch of refinement which a more thorough survey of the contents will reveal as genuine and typical of the entire book. Although issued primarily as a catalogue, it is really more than a mere price reference. The appealing layout and the harmonious use of colors, together with the artistic employment of cuts and type, has rendered this book an accomplishment that will induce the most busy man to thumb through the interesting pages of the introduction.

The purpose of the catalogue has not been sacrificed for effect. The over eighty pages are devoted to listings and page cuts of everything produced by this company. The listings are arranged in a manner as to afford dispatch in reference, everything being grouped in logical sequence. An index, together with notices of importance to the information seeker, also facilitates quick findings.

About 30 pages contain illustrations and listings of such items that are more or less in constant demand in ignition replacement parts for magnetos and distributors. They include all the active parts as are used on all the different makes and models of magnetos and distributors. Following these about 15 pages are given over to a detailed description of the various products such as electrical test stands, service station cabinets, repair shop devices, chargers, magnetizers, meters, etc. The remaining 30 pages are devoted to a "brush car list" showing all the makes of cars in alphabetical order, an "ignition part car, truck, tractor, motorcycle and airplane list," "revised eclipse Bendix drive car list," "buyers' brush car list," and "buyers' ignition car list."

Throughout the United States there are over 10,000 motor haulage lines, some of which have invested as high as \$2,000,000 in the trucking equipment.

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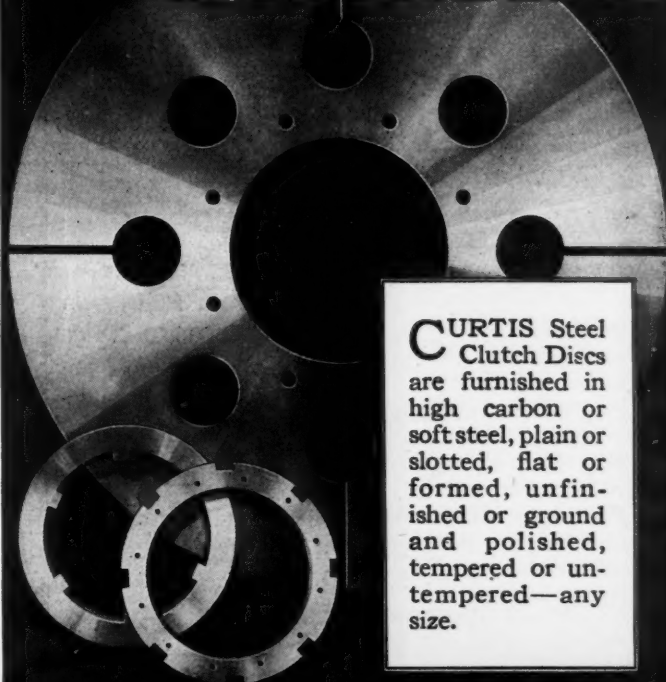
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Speed Truck Engines

The speed truck, up to 1½ tons maximum load weight, looks to its source of power with critical eyes. The demands upon the power plant call for the highest development the engine builder can give if steady operation and low upkeep are to be maintained.

Supreme Engines for one-ton speed vehicles are proved units as to these vital requirements, and feature as salient points:

- Positive force-feed lubrication
- Hot-spot manifold
- Rigidity of construction
- Three-bearing crankshaft
- Exceptional economy

The promise of performance in the design is guaranteed by the manufacturing organization back of every Supreme Engine—an organization composed of men whose record of achievement is expressed in the manufacture of hundreds of thousands of engines and dating back to the earliest days of the automotive industry.

SUPREME MOTORS CORPORATION

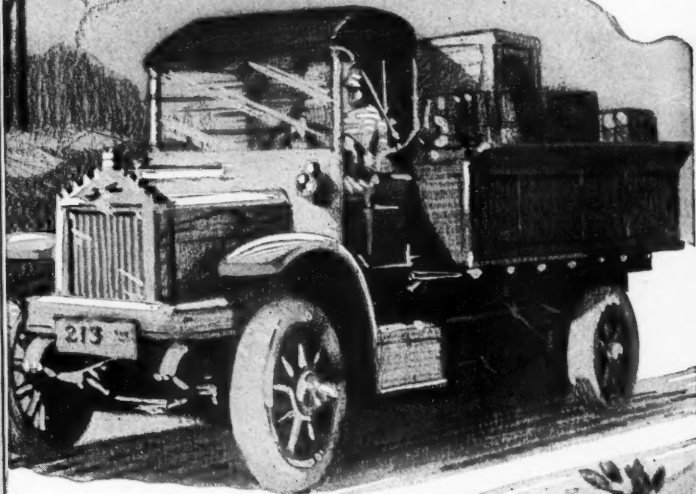
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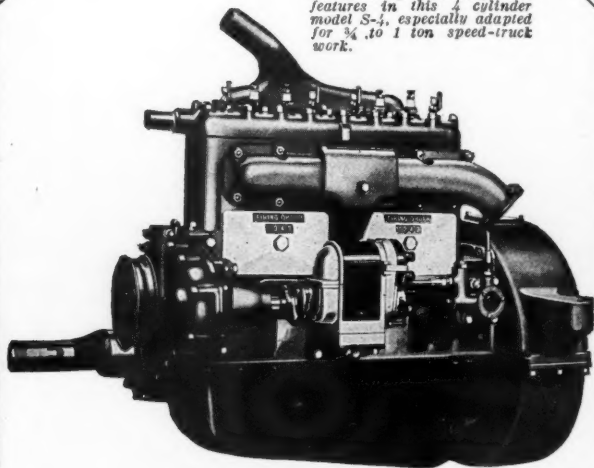


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